

## Original Article

# Effect of predictive nursing combined with amiodarone on the treatment of tachyarrhythmia in patients with coronary heart disease

Tian Luo\*, Xiaojuan Chen\*, Danhe Wang

*Department of Emergency, The Central Hospital of Wuhan, Tongji Medical College, Huazhong University of Science and Technology, Wuhan 430014, Hubei, China. \*Equal contributors and co-first authors.*

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**Abstract:** Objective: We aimed to investigate the clinical effect of predictive nursing combined with amiodarone on the treatment of tachyarrhythmia in patients with coronary heart disease (CHD). Methods: The clinical data of 101 patients with CHD and tachyarrhythmia in our hospital were collected retrospectively and divided into two groups according to different intervention methods. Patients in group A (n=50) were treated with Propafenone, while patients in group B (n=51) were treated with Amiodarone. Meanwhile, patients in both groups were given predictive nursing. The therapeutic effect, cardiac function indexes, electrocardiogram (ECG) monitoring results, ventricular rate, chest pain recurrence, adverse reactions, the conversion rate of atrial fibrillation and re-infarction rate were compared between two groups before and after treatment. Results: The total effective rate of group B was 94.21%, which was higher than 62.00% of group A ( $P<0.05$ ). Compared with group A, group B had lower left ventricular end systolic diameter (LVESD) and left ventricular end diastolic diameter (LVEDD) and higher left ventricular ejection fraction (LVEF) after treatment ( $P<0.05$ ). Group B also showed shorter QRS duration, longer PR interval and lower ventricular rate after treatment ( $P<0.05$ ). The re-infarction rate and incidence of adverse reactions in group B was 3.92% and 5.88%, respectively, which was lower than 22.00% and 24.00% in group A, respectively ( $P<0.05$ ). Conclusion: Predictive nursing combined with amiodarone has ideal clinical therapeutic effects on the treatment of tachyarrhythmia in patients with CHD. It can effectively improve cardiac function, increase the conversion rate of atrial fibrillation, and it can reduce re-infarction rate, recurrence rate of chest pain as well as incidence of adverse reactions.

**Keywords:** Predictive nursing, amiodarone, propafenone, coronary heart disease, tachyarrhythmia, clinical effect

## Introduction

Coronary heart disease (CHD), i.e., coronary atherosclerotic heart disease, belongs to a common kind of clinical cardiovascular diseases [1]; and it is caused by a variety of risk factors, which include modifiable and immutable risk factors. The former contains psychosocial factors, excessive drinking, lack of physical activity, unhealthy lifestyle, diabetes/hypertension, obesity/overweight, dyslipidemia, etc.; and the latter contains family history, age, gender, etc. CHD onset is usually closely correlated to heavy drinking, smoking, satiety, increased physical activity, emotional agitation and seasonal changes [2, 3].

Acute CHD is generally accompanied by arrhythmia, heart failure, fever and other complica-

tions, which pose a serious threat to patients' health and life, with a higher fatality rate between 10% and 15% [4]. Among them, tachyarrhythmia aggravates heart failure, angina pectoris and hemodynamic disorders, and is an essential factor affecting the mortality of patients with CHD during hospitalization [5, 6]. Till now, there has not been a specific drug that can thoroughly treat all kinds of arrhythmias [7]. Amiodarone is a broad-spectrum antiarrhythmic drug and it has been widely applied in various cardiovascular diseases [8]. In addition to effective drug therapy, studies have shown that scientific and reasonable nursing intervention based on drugs is also indispensable to improve the prognosis of patients with CHD and tachyarrhythmia [9, 10]. Predictive nursing as a prospective nursing model which predicts possible serious complications and

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changes in disease conditions, aimed at taking timely and targeting prevention and treatment measures [11].

In view of this, this study combined Amiodarone with predictive nursing to improve the prognosis of patients with CHD and tachyarrhythmia. Previous clinical studies only explored the therapeutic effect of amiodarone in the treatment of CHD and tachyarrhythmia or the application effect of predictive nursing in the intervention of CHD and tachyarrhythmia, while this study combined the two methods, which is innovative and feasible.

### Materials and methods

#### Materials

The clinical data of 101 patients with CHD and tachyarrhythmia in our hospital were collected retrospectively and patients were divided into two groups according to the different intervention methods. Patients in group A (n=50) were treated with Propafenone, while patients in group B (n=51) were treated with Amiodarone. Patients in both groups received predictive nursing. Inclusion criteria: Patients and their family members agreed to sign the informed consent form; patients had no bleeding tendency in the short term; patients had clinical symptoms such as angina pectoris, shortness of breath and palpitation; patients had cardiac function grade I-III; patients had obvious abnormal changes in electrocardiograph (ECG), significantly increased white blood cell count and erythrocyte sedimentation rates. This study was approved by the Medical Ethics Committee of the Central Hospital of Wuhan, Tongji Medical College of Huazhong University of Science and Technology. Exclusion criteria: Patients had severe liver, lung and brain function damage, or mental abnormalities, cognitive dysfunction, visual impairment or disturbance of consciousness, hematological diseases and autoimmune diseases, or sinoatrial nodal and atrioventricular conduction dysfunction.

#### Methods

Control group: Propafenone (SFDA approval No.: H31021153; Shanghai Xinyi Pharmaceutical Co., Ltd.; specification: 50 mg) of 35-70 mg was added into 20-40 ml 0.9% sodium chloride solution (Shijiazhuang Siyao Co., Ltd.;

SFDA approval No.: H20133355; specification: 3000 ml:27 g), and then was injected intravenously within 10 minutes. Propafenone could be increased to 105-210 mg according to this prescription if an ideal therapeutic effect was not obtained. Drug dose was controlled to <140 mg at the time of conversion.

Observation group: The first dose of Amiodarone of 150 mg (SFDA approval No.: H200-44923; Shandong Fangming Pharmaceutical Group Co., Ltd.; specification: 2 ml:0.15 g) was added to 20 ml 5% glucose solution (SFDA approval No.: H19993839; Xinjiang Huashidan Pharmaceutical Co., Ltd.; specification: 500 ml:25 g), and then was injected intravenously within 10 minutes. After that intravenous drip was performed at the speed of 1 mg/min. Six hours later, the speed of intravenous drip was changed to 0.5 mg/min. A patient could receive repeat Amiodarone of 150 mg intravenously if a therapeutic effect was not achieved.

Patients in both groups received predictive nursing: (1) Enhanced observation during high-risk period: The high incidence period of CHD accompanied with tachyarrhythmias is from 9:00 am to 12:00. This maybe due to the body secreting more catecholamines in the morning, which increases heart rate and blood pressure, decreases fibrinolysis and enhances cardiac contractility. Studies have shown that arrhythmias of various types have higher incidence (86%-100%) within 10 days after myocardial infarction, among which arrhythmias within 24 hours after myocardial infarction are the most common. This may be closely related to myocardial reperfusion injury, changes in ventricular wall tension and autonomic nervous activity, and acute myocardial ischemia, etc. Therefore, nurses are instructed to be more vigilant during the high-risk periods of arrhythmia, while paying close attention to patients' condition changes, perform 24-hour continuous ECG monitoring, monitor blood oxygen saturation, blood pressure, heart rhythm and heart rate every 15 minutes, and record all results in detail. When continuous, paired, polymorphic, multifocal, or frequent non-sustained ventricular tachycardia or ventricular extrasystole occurs, nurses are guided to inform doctors immediately and prepare for rescue at any time. (2) Strengthening the prevention of various inducements: After myocardial ischemic necrosis, the vagus or sympathetic nerve overexcites and releases a

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large number of metabolites, which increase catecholamine secretion and eventually causes arrhythmia. In view of this, nurses need to take targeted preventive measures to accurately identify numerous premonitory symptoms in advance, and detect routine blood work, electrolytes, prothrombin time and serum myocardial enzymes every day, to provide a scientific and reasonable basis for further diagnosis. (3) Attaching importance to female patients: A large number of clinical practices have demonstrated that female patients may have delayed diagnosis because of ECG changes and unobvious clinical symptoms, so they have higher fatality rate than male patients. For this reason, nurses are guided to reinforce the protection of female patients to prevent malignant events. (4) Rational drug use: Nurses are taught to correctly use all kinds of antiarrhythmic drugs strictly in accordance with the doctor's instructions, carefully observe patients' vital signs and heart rhythm changes, prepare first aid in advance and avoid accidents. (5) Psychological counseling: Due to the sudden onset, most patients with CHD and tachyarrhythmia are prone to undergo anxiety, panic and negative psychology, which have a serious impact on recovery. Considering this, nurses need to dynamically observe the changes of patients' psychological state and subsequently implement targeting psychological counseling in real time, so as to reduce their psychological pressure and improve treatment compliance. (6) Intensifying daily life guidance: Patients are guided to eating multiple small meals with low-sodium, low-fat, high-protein and high-fiber in their diet to avoid satiety and alleviate cardiac burden from increased abdominal pressure. Smoking or alcohol is also forbidden. Appropriate exercise based on patients' condition is necessary to promote cardiac rehabilitation.

### *Observation indexes*

(1) Evaluation criteria of therapeutic effect [12]: Markedly effective refers to the conversion of tachyarrhythmia (including supraventricular tachycardia and paroxysmal atrial fibrillation) into sinus rhythm; effective refers to atrial rate decreasing to 100 bpm/min below, or heart rate decreasing by <20%; and ineffective refers to no change after treatment. Total effective is equal to markedly effective plus effective. (2) Cardiac function indexes [13]:

Left ventricular ejection fraction (LVEF), left ventricular end systolic diameter (LVESD) and left ventricular end diastolic diameter (LVEDD) of both groups were measured before and after treatment through echocardiography. (3) ECG monitoring results: Continuous ECG monitoring was performed in both groups 24 hours before and after treatment to compare QRS duration and PR interval between both groups. (4) Ventricular rate: Changes in ventricular rate before and after treatment were analyzed and compared between both groups. (5) Recurrence rate of chest pain, conversion rate of atrial fibrillation and re-infarction rate were compared between both groups. (6) Adverse reactions include vomiting, fatigue and nausea.

### *Statistical analysis*

SPSS 22.0 software was performed for statistical analysis. Measurement data were expressed by mean  $\pm$  standard deviation. Data with a normal distribution were analyzed by *t*-test, and data with an abnormal distribution were analyzed by Mann-Whitney U test. Counting data were expressed by n (%) and compared by  $\chi^2$  test between groups. A  $P < 0.05$  was considered as statistically significant.

## **Results**

### *Comparison of general materials between the two groups*

There was no significant difference in gender, age, cardiac functional grade or arrhythmia type between both groups ( $P > 0.05$ ). As shown in **Table 1**.

### *Comparison of therapeutic effect between the two groups*

Group A had 15 markedly effective cases, 16 effective cases and 19 ineffective cases, compared with 28, 20 and 3 in group B, respectively. The total effective rate in group B was 94.21%, which was higher than 62.00% in group A ( $P < 0.05$ ). As shown in **Table 2**.

### *Comparison of cardiac function indexes between the two groups*

Before treatment, LVEF, LVESD and LVEDD showed no significant difference between both groups ( $P > 0.05$ ); LVESD and LVEDD decreased and LVEF increased in both groups after treat-

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**Table 1.** Comparison of general materials between two groups n (%)/( $\bar{x} \pm sd$ )

General materials		Group A (n=50)	Group B (n=51)	t/X <sup>2</sup>	P
Gender (N)	Male	35 (70.00)	37 (72.55)	0.080	0.777
	Female	15 (30.00)	14 (27.45)		
Age (years)		62.15±1.05	62.18±1.02	0.146	0.885
Cardiac functional grade (N)					
	Grade I	13 (26.00)	15 (29.41)	0.089	0.996
	Grade II	18 (36.00)	17 (33.33)		
	Grade III	19 (38.00)	19 (37.25)		
Arrhythmia type (N)					
	Persistent atrial fibrillation	6 (12.00)	7 (13.73)	0.996	0.782
	Paroxysmal atrial fibrillation	15 (30.00)	13 (25.49)		
	Ventricular premature beat	18 (36.00)	19 (37.25)		
	Ventricular tachycardia	11 (22.00)	12 (23.53)		

**Table 2.** Comparison of therapeutic effect between two groups n (%)

Group	N	Markedly effective	Effective	Ineffective	Total effective rate
Group A	50	15 (30.00)	16 (32.00)	19 (28.00)	31 (62.00)
Group B	51	28 (54.90)	20 (39.22)	3 (5.88)	48 (94.12)*
X <sup>2</sup>					15.286
P					0.000

Note: \*refers to  $P < 0.05$  compared with group A.

ment ( $P < 0.05$ ). Compared with group A, LVESD and LVEDD in group B were lower and LVEF was higher after treatment (**Figure 1**).

### Comparison of ECG monitoring results between the two groups

QRS duration and PR interval before treatment were not significantly different from those after treatment ( $P > 0.05$ ). Both groups had a shorter QRS duration and longer PR interval after treatment compared with those before treatment ( $P < 0.05$ ). Group B had a shorter QRS duration and longer PR interval than group A after treatment ( $P < 0.05$ ). As shown in **Figure 2**.

### Comparison of ventricular rate between the two groups

Before treatment, ventricular rate showed no significant difference between the two groups ( $P > 0.05$ ). Both groups had decreased ventricular rate after treatment ( $P < 0.05$ ), and the ventricular rate in group B was lower than that in group A ( $P < 0.05$ ). As shown in **Figure 3**.

### Comparison of recurrence rate of chest pain, conversion rate of atrial fibrillation and re-infarction rate between the two groups

The recurrence rate of chest pain, conversion rate of atrial fibrillation and re-infarction rate in group B was 1.96%, 90.20% and 3.92%, respectively, which was 18.00%, 66.00% and 22.00% in group A, respectively,

and the difference was statistically significant ( $P < 0.05$ ). As shown in **Table 3**.

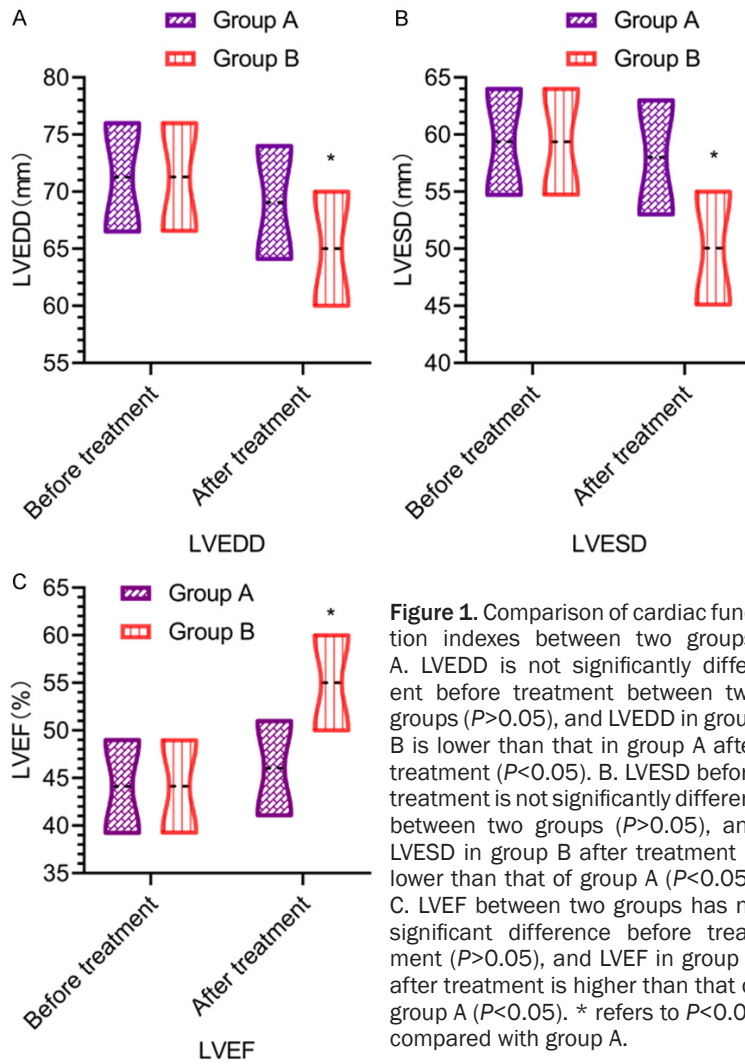
### Comparison of adverse reactions between the two groups

In group A, 5 patients had vomiting, 4 had fatigue and 3 had nausea, while 1 patient had vomiting, 1 had fatigue and 1 had nausea in group B. The incidence of adverse reactions in group B was 5.88%, which was lower than 24.00% in group A ( $P < 0.05$ ). As shown in **Table 4**.

## Discussion

Recently, CHD which is a common cardiovascular disease seen in the clinic, has a significantly increased incidence and has seriously threatened human health [14]. Chest pain, as a typical clinical symptom of CHD, is usually triggered by emotional excitement, physical activity and other situations. Patients may suddenly feel precordial pain (mainly squeezing pain or paroxysmal colic) and also have a tight chest. When myocardial infarction attacks, severe pain oc-

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**Figure 1.** Comparison of cardiac function indexes between two groups. A. LVEDD is not significantly different before treatment between two groups ( $P > 0.05$ ), and LVEDD in group B is lower than that in group A after treatment ( $P < 0.05$ ). B. LVESD before treatment is not significantly different between two groups ( $P > 0.05$ ), and LVESD in group B after treatment is lower than that of group A ( $P < 0.05$ ). C. LVEF between two groups has no significant difference before treatment ( $P > 0.05$ ), and LVEF in group B after treatment is higher than that of group A ( $P < 0.05$ ). \* refers to  $P < 0.05$  compared with group A.

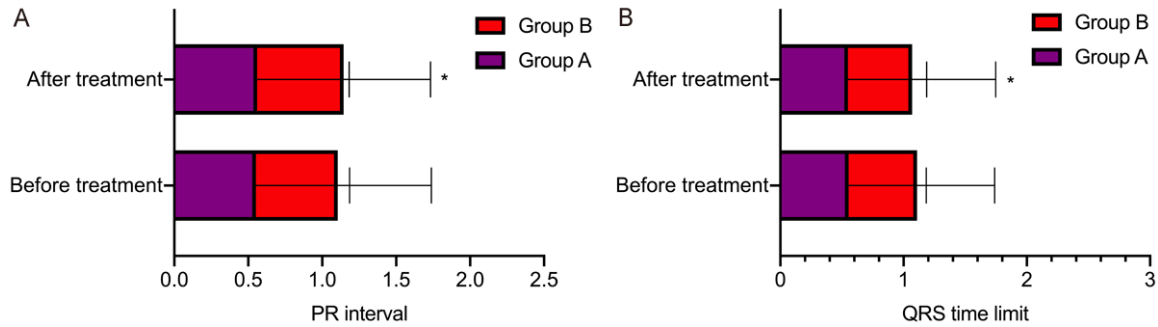
curs and lasts for a relatively long time, it can be accompanied by heart failure, decreased blood pressure, cyanosis, fever, sweating, vomiting, nausea, etc. [15, 16]. Tachyarrhythmia is a common complication of this disease and is seen with high incidence. It further deteriorates the disease condition, leading to patients' inclination to sudden cardiac death and thus poor prognosis [17, 18]. Therefore, a scientific and reasonable way of treatment is desperately needed [19]. In addition, numbers of clinical studies have also shown that scientific and reasonable nursing measures based on drug therapy can additionally improve clinical efficacy and promote recovery [20]. Hence, this study adopted predictive nursing on the basis of Amiodarone application to intervene in tachyarrhythmia in patients with CHD.

In this study, the total effective rate, conversion rate of atrial fibrillation, cardiac function

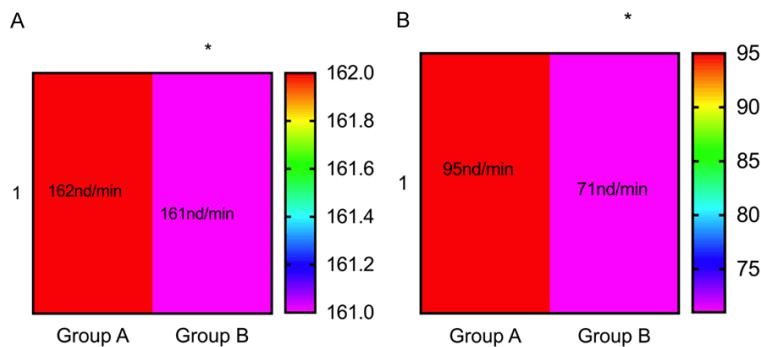
indexes, ECG monitoring results and the ventricular rate in group B were all better than those in group A after treatment, while the recurrence rate of chest pain, re-infarction rate and incidence of adverse reactions in group B were lower compared with group A ( $P < 0.05$ ), indicating that predictive nursing combined with Amiodarone has an ideal therapeutic effect on the treatment of tachyarrhythmias in patients with CHD and consequently improves cardiac function, increases the conversion rate of atrial fibrillation, and reduces re-infarction rate, recurrence rate of chest pain and incidence of adverse reactions. Chen et al [21] also applied Amiodarone in the emergency treatment of tachyarrhythmia in patients with CHD, and the results showed that the total effective rate of the Amiodarone group was significantly higher than that of the control group, which fully demonstrated the effectiveness of Amiodarone. Tang et al [22] adopted a predictive nursing model in the nursing of CHD,

and the results showed that the intervention effect of the predictive nursing group was significantly better than that of the conventional nursing group, which fully proved the effectiveness of predictive nursing. As for its mechanisms, Amiodarone is a broad-spectrum antiarrhythmic drug with a high clinical rate, which can block calcium and sodium channels, block  $\beta$ -receptors and  $\alpha$ -receptors and inhibit cell enrichment, prolong impulse conductance and decrease the conductivity and automaticity of cardiomyocytes [13]. Meanwhile, Amiodarone can also dilate vascular smooth muscle and reduce peripheral vascular resistance and myocardial oxygen consumption, consequently protecting an ischemic myocardium and reducing sudden death rate and arrhythmia incidence [2, 3]. Moreover, Amiodarone exhibits a lower incidence of adverse reactions and safe administration, with adverse effects only in rare cases [23]. In line with the concept of modern

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**Figure 2.** Comparison of ECG monitoring results between two groups. A. PR interval between two groups has no significant difference before treatment ( $P>0.05$ ), and group B had longer PR interval than group A after treatment ( $P<0.05$ ). B. Both groups are not significantly different in PR interval before treatment ( $P>0.05$ ), and group B had shorter QRS duration than group A after treatment ( $P<0.05$ ). \* refers to  $P<0.05$  compared with group A.



**Figure 3.** Comparison of ventricular rate between two groups. (A) Ventricular rates between two groups are not significantly different before treatment ( $P>0.05$ ), and (B) the ventricular rate of group B after treatment is lower than that of group A ( $P<0.05$ ).

**Table 3.** Comparison of recurrence rate of chest pain, conversion rate of atrial fibrillation and re-infarction rate between two groups n (%)

Group	N	Recurrence rate of chest pain	Conversion rate of atrial fibrillation	Re-infarction rate
Group A	50	9 (18.00)	33 (66.00)	11 (22.00)
Group B	51	1 (1.96)*	46 (90.20)*	2 (3.92)*
$\chi^2$		5.408	8.676	7.358
$P$		0.020	0.003	0.007

Note: \*refers to  $P<0.05$  compared with group A.

**Table 4.** Comparison of adverse reactions between two groups n (%)

Group	N	Vomiting	Fatigue	Nausea	Total incidence
Group A	50	5 (10.00)	4 (8.00)	3 (6.00)	12 (24.00)
Group B	51	1 (1.96)	1 (1.96)	1 (1.96)	3 (5.88)*
$\chi^2$					6.554
$P$					0.010

Note: \*refers to  $P<0.05$  compared with group A.

nursing, predictive nursing as a prospective model that targets the various risk factors of diseases as well as possible situations and takes preventive measures in advance, in order to alleviate disease exacerbation and better protect patients' life and safety. This nursing mode demands nurses firstly analyze and evaluating patients' condition comprehensively in strict accordance with nursing procedures. Second, nurses also need to predict the possible nursing risks and actively take corresponding measures. Third, nurses are required to directly participate in the treatment process rather than simply perform doctor's orders. On the other hand, this mode insists on being people oriented. Nurses timely observe patients' emotional changes and provide targeting counseling. High standards of humanistic care are also of great significance to relieve patients' panic in the face of diseases, thus contributing to a good nurse-patient relationship and recovery promotion.

To summarize, predictive nursing combined with Amiodar-

one has an ideal clinical effect on the treatment of tachyarrhythmia in patients with CHD. It can effectively improve cardiac function, increase the conversion rate of atrial fibrillation and reduce re-infarction rates, recurrence rate of chest pain and incidence of adverse reactions.

Despite certain achievement, our study has the limitation of a small sample size, which will be overcome by more comprehensive studies with larger sample size and longer terms of study in the future.

### Disclosure of conflict of interest

None.

**Address correspondence to:** Danhe Wang, Department of Emergency, The Central Hospital of Wuhan, Tongji Medical College, Huazhong University of Science and Technology, No. 26 Shengli Street, Jiang'an District, Wuhan 430014, Hubei, China. Tel: +86-15392910828; E-mail: wang344837496@163.com

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