World Journal of
Clinical Cases

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RESPONSIBLE EDITORS FOR THIS ISSUE

Retrospective Study

Effect of cardiac rehabilitation care after coronary intervention on cardiac function recovery and negative mood in patients with myocardial infarction

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Abstract

BACKGROUND
Cardiovascular disease, particularly myocardial infarction (MI) profound impact on patients' quality of life and places a substantial burden on the healthcare and economy systems. Developments in medical technology have led to the emergence of coronary intervention as an essential method for treating MI.

AIM
To assess the effects of cardiac rehabilitation care on cardiac function recovery and negative emotions in MI after coronary intervention.

METHODS
This study included a total of 180 patients with MI during the period from June 2022 to July 2023. Selected patients were divided into two groups: An observation group, which receiving cardiac rehabilitation care; a control group, which receiving conventional care. By comparing multiple observation indicators such as cardiac function indicators, blood pressure, exercise tolerance, occurrence of adverse cardiac events, and negative emotion scores between the two groups of patients. All the data were analyzed and compared between two groups.

RESULTS
There were 44 males and 46 females in the observation group with an average age

of 36.26 ± 9.88 yr; there were 43 males and 47 females in the control group, with an average age of 40.87 ± 10.5 yr. After receiving the appropriate postoperative nursing measures, the results of the observation group showed significant improvement in several indicators compared with the control group. Indicators of cardiac function, such as left ventricular end-diastolic internal diameter and left ventricular ejection fraction were significantly better in the observation group than in the control group ($P < 0.05$). Exercise endurance assessment showed that the 6-minute walking test distance was significantly increased in the patients of the observation group ($P < 0.01$). In addition, the incidence of adverse cardiac events was significantly lower in the observation group, and negative mood scores were significantly reduced ($P < 0.05$).

CONCLUSION
Cardiac rehabilitation care after coronary intervention has a significant positive impact on functional recovery. This emphasizes the importance of cardiac rehabilitation care to improve patient recovery.

Key Words: Myocardial infarction; Coronary artery intervention; Cardiac rehabilitation; Cardiac function recovery; Negative emotions

Core Tip: Among them, myocardial infarction, as a serious cardiovascular disease, not only brings a huge impact on the quality of life of patients, but also causes a huge burden to the medical system and social economy. The aim of this study was to assess the effects of cardiac rehabilitation care on cardiac function recovery and negative emotions in patients with myocardial infarction after coronary intervention. This emphasizes the importance of promoting cardiac rehabilitation care to improve patient recovery and overall health.

INTRODUCTION

Cardiovascular disease has become one of the most common problems that endanger human health[1]. Among them, myocardial infarction (MI), as a serious cardiovascular disease, not only brings a huge impact on the quality of life (QOL) of patients, but also causes a huge burden to the medical system and social economy[2]. With the continuous progress of medical technology, percutaneous coronary intervention (PCI) has become an essential method to treat MI, providing patients with more effective revascularization and myocardial protection channels[3,4]. However, surgical treatment is only the first step in the treatment of MI, and subsequent cardiac rehabilitation care can not be ignored. Cardiac rehabilitation care plays a critical role in promoting cardiac function recovery, improving the QOL, and alleviating negative emotions[5,6].

This paper aims to investigate the effects of cardiac rehabilitation care after PCI on cardiac function recovery and negative mood in patients with MI. Through clinical research analysis, we explored the mechanism of cardiac rehabilitation care in promoting the cardiac function recovery, and how to recover heart health through various means such as physical exercise, psychological support, and nutritional guidance. Moreover, study the regulation effect of cardiac rehabilitation nursing on negative emotions (such as depression, anxiety, *etc.*) in patients with MI, and explore the value in improving the QOL and reducing patients' psychological pressure.

In this paper, we comprehensively examined the impact of cardiac rehabilitation care after PCI on cardiac function recovery and negative emotions in patients with MI. Emphasizing the role of cardiac rehabilitation care is not only promoting cardiac function rehabilitation, but also having a positive impact on negative emotions. By systematically observing and analyzing multiple key indicators, we explored the dual effects of rehabilitation care on patients' physical and psychological health, providing new theoretical and practical support for the comprehensive rehabilitation of patients with MI. This research provides a new perspective of cardiac rehabilitation and useful implications for clinical practice and future research directions.

MATERIALS AND METHODS

General information

A total of 180 MI patients undergoing PCI from June 2022 to July 2023 were selected and divided into observation and control groups in different care methods, with 90 patients in each group. Patients in the observation group received

cardiac rehabilitation care after PCI: 44 males and 46 females, aged 22-58 yr, mean age (36.26 ± 9.88). While, patients in the control group received a routine care; there were 43 males and 47 females, aged 19-62 yr, mean age (40.87 ± 10.5). The data were comparable ($P > 0.05$). The patient and the family members signed the informed consent. This study was approved by the People's Hospital of Dongxihu District Ethics Committee.

Inclusion criteria: (1) The patient must undergo clinical evaluation and relevant examination by a professional doctor to meet the diagnosis of MI; (2) Meet the criteria for PCI indication; (3) No history of cardiovascular surgery; (4) Conscious and good compliance; and (5) Voluntarily participated in the study and has signed the informed consent.

Exclusion criteria: (1) Other serious organ dysfunction or diseases; (2) Serious cardiovascular complications after surgery; (3) Unable to participate in rehabilitation care measures due to cognitive impairment, psychiatric symptoms, and other reasons; and (4) Received cardiac rehabilitation care during the last 6 mo.

The observation group adopted the cardiac rehabilitation nursing measures

Cardiac rehabilitation nursing measures adopted by the observation group: (1) Personalized exercise plan: Make a personalized exercise plan according to each patient's age, physical condition, and heart function recovery. The program will include appropriate aerobic exercises, such as walking, cycling and swimming, as well as training to enhance muscle strength and cardiopulmonary function; (2) Psychological support and intervention: To provide psychological counseling and support for each patient, to help them cope with the emotional stress and anxiety after surgery. Psychological interventions will employ methods such as cognitive behavioral therapy and relaxation training to promote positive emotional and mental health; (3) Nutrition consultation and dietary guidance: Professional dietitians shall provide personalized dietary advice and make a healthy diet plan according to the patients' physical conditions and nutritional needs. The dietary protocol will emphasize the principles of low salt, low fat, and high fiber to promote cardiovascular health; (4) Drug management and monitoring: Monitor the drug treatment to ensure that they take medicine on time and use drugs rationally. However, its essential to regularly test the physiological indicators to adjust the medication regimen, such as blood pressure, blood lipids, and cardiac function assessment; and (5) Health education: Through lectures, manuals and online resources, patients are taught heart health knowledge, including lifestyle adjustment and ways to deal with acute situations, so as to improve their health awareness and self-management ability[7,8].

The control group used the usual care measures

Control patients received a routine care including explaining the pathogenesis of MI and the importance of PCI method. After the operation, we strengthen the frequency of inspection and pay attention to the vital signs monitoring. If any abnormal situation occurs, a serious step will be taken immediately. At the same time, to ensure an adequate nutritional supply, we provided a dietary advice to encourage patient's diet with high in protein and vitamins. Furthermore, patients are required to take strict bed rest to facilitate recovery.

During the process of care in both groups, we maintained a close communication with the patients and regularly evaluate the effect of rehabilitation regularly. Monitoring the changes in physical and psychological indicators and providing a comprehensive understanding of the effects of different nursing measures on cardiac function recovery and negative emotions, which provides a scientific data to support the study results.

Observational indicators

Observation and comparison of cardiac function indicators before and after receiving care: We compared the cardiac function indicators in two groups before and after receiving care, including left ventricular end-diastolic diameter (LVEDd) and left ventricular ejection fraction (LVEF). These indicators help us to assess the changes in cardiac systolic and diastolic function and thus understand the effects of rehabilitation care on cardiac function.

To reflect the patients' blood pressure changes to assess the effect of rehabilitation care on vascular health. Before and after the patient's care, we measured the diastolic blood pressure (DBP), systolic blood pressure (SBP), and calculate the mean arterial pressure (MAP), MAP = (SBP + 2 DBP)/3.

By performing a 6-minute walking test, we evaluate exercise endurance in both groups before and after receiving care. This recorded the distance walks within 6 minutes to reflect changes in patients motor capacity.

Observe and compare the adverse cardiac events, including angina, arrhythmia, during receiving care, and heart failure, to assess the effects and risks of rehabilitation care on cardiovascular health.

Negative emotion assessment: compare depression and anxiety before and after care using self-rating anxiety scale (SAS) and self-rating depression scale (SDS). The analysis of the score reflects the influence of rehabilitation care on patients' mental health.

Statistical analysis

Analysis the data by SPSS software version 20.0, measurement data described in mean ± SD, two *t*-test; count data expressed in % and χ^2 test; $P < 0.05$ was considered as significant.

RESULTS

General information

Comparing the general data including age, sex, and BMI between the groups, the difference was not statistically

Table 1 Baseline data of patients in the observed and control groups

Project	Observation group	Control group
Sex, *n* (%)		
Man	44 (48.9)	43 (47.8)
Woman	46 (51.1)	47 (52.2)
Age, mean ± SD	36.26 ± 9.88	40.87 ± 10.5
BMI, mean ± SD	23.2 ± 2.84	22.88 ± 1.57
Marriage situation, *n* (%)		
Married	62 (68.9)	59 (65.6)
Unmarried	28 (31.1)	31 (34.4)
Educational status, *n* (%)		
Primary school	13 (14.4)	16 (17.8)
Middle school	32 (35.6)	35 (38.8)
University	45 (50)	39 (43.3)
F Hx, *n* (%)		
Yes	4 (4.4)	2 (2.2)
Deny	86 (95.6)	88 (87.8)
Hospital admissions for myocardial infarction, *n* (%)		
< 2	63 (70)	59 (65.6)
2-3	19 (21.1)	21 (23.3)
> 3	8 (8.9)	10 (11.1)

BMI: Body mass index.

significant ($P > 0.05$), as detailed in Table 1. The clinical data of both groups are shown in Table 2.

Cardiac function indicators
LVEDd and LVEF were higher than those before the intervention and the observation group was higher than the control group ($P < 0.05$).as shown in Table 3.

Changes in blood pressure
Before care, DBP, SBP and the MAP were not significantly different ($P > 0.05$); after follow-up, DBP, SBP, and MAP were higher in the observation group than the control group ($P < 0.05$), as shown in Table 4.

A 6-min walking distance of and between us
The 6-min post-intervention walk test distance was longer than that before the intervention, and the observation group was higher than the control group ($P < 0.05$), as shown in Table 5.

Comparison of the incidence of adverse cardiac events between the two groups
The incidence of cardiac adverse events in the observation group was lower than that in the control group ($P < 0.05$) as shown in Table 6.

Negative emotion assessment
Both groups had lower SAS and SDS scores after receiving care. Patients in the observation group scored better than the control group, as shown in Table 7.

DISCUSSION

MI is a serious cardiovascular disease that endangers patient's life, leads to impaired heart function, decreased QOL, and even disability[9]. With the change of modern lifestyle and the trend of population aging, the incidence of MI increases yearly posing a serious threat to social public health[10]. PCI has an important role in MI treatment[11]. In particular, PCI

Table 2 Clinical data of patients in the observation and control groups

Project	Observation group	Control group	t	P value
Total cholesterol (mmol/L)	4.1 ± 1.2	4.0 ± 1.4	0.514	0.608
Triglyceride (mmol/L)	1.6 ± 0.7	1.8 ± 0.6	-1.029	0.305
Lactate dehydrogenase (U/L)	385.6 ± 24.2	391.4 ± 18.4	-1.810	0.072
Creatine Phosphokinase (U/L)	174.5 ± 15.2	176.2 ± 18.4	-0.676	0.500
Creatine phosphokinase isozyme (%)	4.2 ± 1.1	3.9 ± 1.4	1.599	0.112
Transaminase (U/L)	45.2 ± 5.2	42.9 ± 4.9	0.753	0.003
α-Hydroxybutyrate dehydrogenase (U/L)	221.7 ± 20.5	226.1 ± 17.2	-1.560	0.121
Glutamaminase (U/L)	39.6 ± 9.6	43.1 ± 8.4	-2.603	0.010

Table 3 Comparison of cardiac function indicators between the two groups

Group	n	LVEDd (mm)		LVEF (%)	
		Before nursing	After nursing	Before nursing	After nursing
Observation group	90	50.78 ± 6.14	62.04 ± 7.54[a]	37.27 ± 5.21	49.20 ± 6.27[a]
Control group	90	51.01 ± 5.58	59.11 ± 6.21[a]	37.56 ± 4.52	43.36 ± 5.74[a]
t		0.274	2.846	0.399	6.518
P value		0.664	0.005	0.690	0.00

[a]$p < 0.05$.

LVEDd: Left ventricular end-diastolic diameter; LVEF: Left ventricular ejection fraction.

Table 4 Comparison of blood pressure before care and after follow-up in the two groups

Group	DBP		SBP		MAP	
	Before nursing	After nursing	Before nursing	After nursing	Before nursing	After nursing
Control group	74.84 ± 3.63	85.32 ± 3.68[a]	112.59 ± 5.16	127.54 ± 6.39[a]	86.65 ± 5.13	98.64 ± 5.65[a]
Observation group	74.52 ± 3.45	79.62 ± 3.27[a]	113.47 ± 5.28	122.89 ± 6.79[a]	87.52 ± 5.02	93.65 ± 5.78[a]
t	0.796	10.984	1.131	4.731	1.150	5.857
P value	0.427	0.00	0.260	0.00	0.252	0.00

[a]$p < 0.05$ compared with the same group.

DBP: Diastolic blood pressure; SBP: Systolic blood pressure; MAP: Mean arterial pressure.

saves the patient's life and improves cardiac function by inserting stents in the coronary artery stenosis to restore blood supply and reduce the extent of ischemic injury[12,13]. However, postoperative cardiac function recovery and mental health remain important issues of concern. While, previous studies in China conduct the incidence of cardiovascular endpoint events within 1 year after PCI is about 10%[14].

Cardiac rehabilitation care plays an indispensable role in the treatment process after PCI[15]. The American College of Cardiology and the American Heart Association, recommended starting early cardiac rehabilitation after stable circulatory function[16]. As demonstrated in this study, cardiac rehabilitation care provides a comprehensive support and guidance to patients through personalized rehabilitation programs. First, cardiac rehabilitation care emphasizes individualized treatment plans that combine treatment strategies with the patient's specific situation. Each patient has different rehabilitation needs after MI; cardiac rehabilitation care through detailed evaluation of the patient's heart function; physical level and psychological state; develop personalized rehabilitation program to ensure the pertinence and effectiveness of treatment[17]. Secondly, cardiac rehabilitation care covers multiple fields, including physical training, medication management, psychological interventions, and nutritional guidance. Through exercise programs such as aerobic exercise, strength training, and rehabilitation gymnastics, the cardiac rehabilitation care improve physical activity levels, cardiopulmonary function, and exercise endurance. At the same time, rehabilitation care can also provide targeted drug treatment for patients with MI. In addition, through psychological support and cognitive behavioral therapy, cardiac

Table 5 Comparison of 6-min walk test distance between two groups (mean ± SD, m)

Group	n	Before the intervention	After the intervention
Observation group	90	268.91 ± 14.63	354.91 ± 20.56[a]
Control group	90	266.84 ± 10.91	329.34 ± 22.19[a]
t		1.076	8.019
P value		0.283	0.00

[a]$P < 0.05$.

Table 6 Comparison of the incidence of non-cardiac adverse events between the two groups

Group	n	Angina pectoris (%)	Arrhythmia (%)	Heart failure (%)	Incidence (%)
Observation group	90	4 (4.44)	3 (3.33)	2 (2.22)	9 (10)
Control group	90	6 (6.67)	6 (6.67)	4 (4.44)	16 (17.7)[a]

[a]$P < 0.05$ compared with the control group.
$\chi^2 = 3.855$, $P = 0.039$.

Table 7 Comparison of self-rating anxiety scale and self-rating depression scale score index before and after rehabilitation care in the two groups

Group	n	SAS grade		SDS grade	
		Before nursing	After nursing	Before nursing	After nursing
Observation group	90	72.52 ± 6.25	57.66 ± 4.32[a]	79.04 ± 6.92	56.40 ± 5.16[a]
Control group	90	72.54 ± 6.74	62.25 ± 5.74[a]	78.56 ± 7.15	65.24 ± 5.81[a]
t		0.021	6.061	1.049	10.792
P value		0.984	0.00	0.648	0.00

[a]$P < 0.05$ compared with the same group before care.
SAS: Self-rating anxiety scale; SDS: Self-rating depression scale.

rehabilitation and care can help patients cope with emotional problems and reduce depression and anxiety symptoms. In terms of nutritional guidance, rehabilitation care can guide patients to choose an appropriate diet to maintain heart health and physical function[18]. However, cardiac rehabilitation nursing has achieved comprehensive results through multidisciplinary teamwork. In particular, rehabilitation care is usually done by a team of cardiologists, physicians, and rehabilitation professionals. Multidisciplinary teamwork develops the treatment plan and provides a full range of interventions at the physical, psychological, and social levels to improve the rehabilitation effect and QOL[19].

However, there are still some factors in the implementation of cardiac rehabilitation care in China[20]. In particular, China has established more than 500 cardiac rehabilitation centers, but the lack of unified national standards and certification institutions, resulting in the quality of rehabilitation can not reach the same level. Unified standards also need to be established to improve the level of cardiac rehabilitation services and ensure that patients receive comprehensive and continuous treatment. The cardiac rehabilitation team in China is mainly composed of cardiologists, nurses, and rehabilitation therapists, but a lack of multidisciplinary members including pharmacists, dietitians, and psychological counselors. The training and certification levels of the cardiac rehabilitation specialist nurses still need to be improved. The lack systematic training and access system for rehabilitation personnel in China leads to the lack of understanding of cardiac rehabilitation theory and practice among medical staff and patients, which may limit the program development. Finally, not only medical staff need to receive comprehensive training, but also need to provide patients with relevant health education, establish a good doctor-patient relationship, and improve patients' compliance [21].

Cardiac rehabilitation care after PCI significantly promoted the reversal and improvement of cardiac function, reflected in the positive changes in several cardiac function parameters, such as LVEDd, LVEF, and LVEDd. In addition, rehabilitation nursing has not only shown remarkable results in blood pressure management and the improvement of exercise endurance, but also has a beneficial impact in reducing the incidence of adverse cardiac events and alleviating the patient's negative emotions. These highlight the critical role of cardiac rehabilitation care in the treatment paradigm of MI

and the value in promoting cardiovascular health and improving QOL.

CONCLUSION

Cardiac rehabilitation nursing is not only a simple treatment process in the rehabilitation of patients with MI after PCI, but also a comprehensive and personalized treatment mode. Through a variety of interventions, it targets the multiple problems of patients, promotes the improvement of cardiac function, physical fitness and the recovery of mental health, and provides strong support and guidance for the recovery of patients. With the continuous development of clinical practice, cardiac rehabilitation nursing will certainly play an increasingly important role in the treatment of MI and bring more health benefits to patients.

ARTICLE HIGHLIGHTS

Research background
Cardiovascular disease, particularly myocardial infarction (MI), has a profound impact on patient quality of life (QOL) and is a significant burden on healthcare and economic systems. The development of medical technology has led to coronary intervention as a basic treatment for MI.

Research motivation
The importance of cardiac rehabilitation care is gaining increasing attention. Many studies have shown that cardiac rehabilitation care is effective in improving cardiac function and reducing negative emotions in patients with MI.

Research objectives
To assess the impact of cardiac rehabilitation care on cardiac function recovery and negative mood in coronary intervention after MI.

Research methods
The observation group, received cardiac rehabilitation; the control group, received conventional treatment.

Research results
Patients in the observation group showed significant improvements in function indicators, blood pressure, exercise tolerance, occurrence of adverse cardiac events, and negative emotion at the end of the study.

Research conclusions
This study shows that cardiac rehabilitation care can be effective in improving cardiac function and reducing negative emotions in MI patients undergoing coronary intervention. Therefore, it is essential for MI patients to receive timely cardiac rehabilitation care.

Research perspectives
After coronary intervention, a comprehensive cardiac rehabilitation care program has significant results on improving physical function and QOL.

FOOTNOTES

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REFERENCES

1 **Ma LY**, Chen WW, Gao RL, Liu LS, Zhu ML, Wang YJ, Wu ZS, Li HJ, Gu DF, Yang YJ, Zheng Z, Hu SS. China cardiovascular diseases report 2018: an updated summary. *J Geriatr Cardiol* 2020; **17**: 1-8 [PMID: 32133031 DOI: 10.11909/j.issn.1671-5411.2020.01.001]

2 **Gong FF**, Vaitenas I, Malaisrie SC, Maganti K. Mechanical Complications of Acute Myocardial Infarction: A Review. *JAMA Cardiol* 2021; **6**: 341-349 [PMID: 33295949 DOI: 10.1001/jamacardio.2020.3690]

3 **Zhang Q**, Wang L, Wang S, Cheng H, Xu L, Pei G, Wang Y, Fu C, Jiang Y, He C, Wei Q. Signaling pathways and targeted therapy for myocardial infarction. *Signal Transduct Target Ther* 2022; **7**: 78 [PMID: 35273164 DOI: 10.1038/s41392-022-00925-z]

4 **Puymirat E**, Cayla G, Simon T, Steg PG, Montalescot G, Durand-Zaleski I, le Bras A, Gallet R, Khalife K, Morelle JF, Motreff P, Lemesle G, Dillinger JG, Lhermusier T, Silvain J, Roule V, Labèque JN, Rangé G, Ducrocq G, Cottin Y, Blanchard D, Charles Nelson A, De Bruyne B, Chatellier G, Danchin N; FLOWER-MI Study Investigators. Multivessel PCI Guided by FFR or Angiography for Myocardial Infarction. *N Engl J Med* 2021; **385**: 297-308 [PMID: 33999545 DOI: 10.1056/NEJMoa2104650]

5 **Su JJ**, Yu DS. Effects of a nurse-led eHealth cardiac rehabilitation programme on health outcomes of patients with coronary heart disease: A randomised controlled trial. *Int J Nurs Stud* 2021; **122**: 104040 [PMID: 34333211 DOI: 10.1016/j.ijnurstu.2021.104040]

6 **Arjunan P**, Trichur RV. The Impact of Nurse-Led Cardiac Rehabilitation on Quality of Life and Biophysiological Parameters in Patients With Heart Failure: A Randomized Clinical Trial. *J Nurs Res* 2020; **29**: e130 [PMID: 33031130 DOI: 10.1097/JNR.0000000000000407]

7 **Wongvibulsin S**, Habeos EE, Huynh PP, Xun H, Shan R, Porosnicu Rodriguez KA, Wang J, Gandapur YK, Osuji N, Shah LM, Spaulding EM, Hung G, Knowles K, Yang WE, Marvel FA, Levin E, Maron DJ, Gordon NF, Martin SS. Digital Health Interventions for Cardiac Rehabilitation: Systematic Literature Review. *J Med Internet Res* 2021; **23**: e18773 [PMID: 33555259 DOI: 10.2196/18773]

8 **Yuan LX**, Ding RJ. [Interpretation of Chinese guidelines for cardiac rehabilitation and secondary prevention]. *Zhongguo Xunhuan Zazhi* 2019; **34**: 86-90

9 **Jenča D**, Melenovský V, Stehlik J, Staněk V, Kettner J, Kautzner J, Adámková V, Wohlfahrt P. Heart failure after myocardial infarction: incidence and predictors. *ESC Heart Fail* 2021; **8**: 222-237 [PMID: 33319509 DOI: 10.1002/ehf2.13144]

10 **Harris DE**. Perioperative Acute Myocardial Infarction and Ischemia After Noncardiac Surgery: Pathophysiology, Prevention, and Nursing Implications. *AORN J* 2022; **116**: 517-531 [PMID: 36440938 DOI: 10.1002/aorn.13826]

11 **Marquis-Gravel G**, Zeitouni M, Kochar A, Jones WS, Sketch MH Jr, Rao SV, Patel MR, Ohman EM. Technical consideration in acute myocardial infarction with cardiogenic shock: A review of antithrombotic and PCI therapies. *Catheter Cardiovasc Interv* 2020; **95**: 924-931 [PMID: 31435999 DOI: 10.1002/ccd.28455]

12 **Nicolas J**, Beerkens F, Cao D, Sartori S, Pivato CA, Qiu H, Giustino G, Chiarito M, Claessen BE, Zhang Z, Nardin M, Razuk V, Jones D, Camaj A, Power D, Banashefski B, Sweeny J, Baber U, Dangas G, Sharma SK, Kini A, Mehran R. Performance of the academic research consortium high-bleeding risk criteria in patients undergoing PCI for acute myocardial infarction. *J Thromb Thrombolysis* 2022; **53**: 20-29 [PMID: 34347202 DOI: 10.1007/s11239-021-02534-z]

13 **Ozaki Y**, Hara H, Onuma Y, Katagiri Y, Amano T, Kobayashi Y, Muramatsu T, Ishii H, Kozuma K, Tanaka N, Matsuo H, Uemura S, Kadota K, Hikichi Y, Tsujita K, Ako J, Nakagawa Y, Morino Y, Hamanaka I, Shiode N, Shite J, Honye J, Matsubara T, Kawai K, Igarashi Y, Okamura A, Ogawa T, Shibata Y, Tsuji T, Yajima J, Iwabuchi K, Komatsu N, Sugano T, Yamaki M, Yamada S, Hirase H, Miyashita Y, Yoshimachi F, Kobayashi M, Aoki J, Oda H, Katahira Y, Ueda K, Nishino M, Nakao K, Michishita I, Ueno T, Inohara T, Kohsaka S, Ismail TF, Serruys PW, Nakamura M, Yokoi H, Ikari Y; Task Force on Primary Percutaneous Coronary Intervention (PCI) of the Japanese Cardiovascular Interventional Therapeutics (CVIT). CVIT expert consensus document on primary percutaneous coronary intervention (PCI) for acute myocardial infarction (AMI) update 2022. *Cardiovasc Interv Ther* 2022; **37**: 1-34 [PMID: 35018605 DOI: 10.1007/s12928-021-00829-9]

14 **Zhang X**, Wang SR, Li RJ. [Research progress in the treatment of traditional Chinese medicine in cardiac rehabilitation after percutaneous coronary intervention for coronary heart disease]. *Zhongxiyi Jiehe Xinnaoxueguanbing Zazhi* 2017; **15**: 428-432

15 **Qu B**, Hou Q, Men X, Zhai X, Jiang T, Wang R. Research and application of KABP nursing model in cardiac rehabilitation of patients with acute myocardial infarction after PCI. *Am J Transl Res* 2021; **13**: 3022-3033 [PMID: 34017470]

16 **Levine GN**, Bates ER, Bittl JA, Brindis RG, Fihn SD, Fleisher LA, Granger CB, Lange RA, Mack MJ, Mauri L, Mehran R, Mukherjee D, Newby LK, O'Gara PT, Sabatine MS, Smith PK, Smith SC Jr. 2016 ACC/AHA Guideline Focused Update on Duration of Dual Antiplatelet Therapy in Patients With Coronary Artery Disease: A Report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines: An Update of the 2011 ACCF/AHA/SCAI Guideline for Percutaneous Coronary Intervention, 2011 ACCF/AHA Guideline for Coronary Artery Bypass Graft Surgery, 2012 ACC/AHA/ACP/AATS/PCNA/SCAI/STS Guideline for the Diagnosis and Management of Patients With Stable Ischemic Heart Disease, 2013 ACCF/AHA Guideline for the Management of ST-Elevation Myocardial Infarction, 2014 AHA/ACC Guideline for the Management of Patients With Non-ST-Elevation Acute Coronary Syndromes, and 2014 ACC/AHA Guideline on Perioperative Cardiovascular Evaluation and Management of Patients Undergoing Noncardiac Surgery. *Circulation* 2016; **134**: e123-e155 [PMID: 27026020 DOI: 10.1161/CIR.0000000000000404]

17 **Guo SS**, Xu JH, Xue T. [Research progress on the application of early cardiac rehabilitation in postoperative care of PCI in patients with acute coronary syndrome]. *Huli Yanjiu* 2023; **37**: 1778-1782

18 **Dalal HM**, Doherty P, Taylor RS. Cardiac rehabilitation. *BMJ* 2015; **351**: h5000 [PMID: 26419744 DOI: 10.1136/bmj.h5000]

19 **Lin SH**, Neubeck L, Gallagher R. Educational Preparation, Roles, and Competencies to Guide Career Development for Cardiac Rehabilitation Nurses. *J Cardiovasc Nurs* 2017; **32**: 244-259 [PMID: 27281054 DOI: 10.1097/JCN.0000000000000346]

20 **Guo HY**. [The dilemma and countermeasures of cardiac rehabilitation in Chin]. *Zhongguo Quanke Yixue* 2019; **22**: 1381-1384

21 **Afilalo J**. Evaluating and Treating Frailty in Cardiac Rehabilitation. *Clin Geriatr Med* 2019; **35**: 445-457 [PMID: 31543177 DOI: 10.1016/j.cger.2019.07.002]