Nursing Measures of Microcirculation Disturbance in Emergency Patients with Acute Myocardial Infarction after Intervention

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To explore the nursing measures taken for microcirculation disturbance in emergency patients with acute myocardial infarction after percutaneous coronary intervention. 100 cases of emergency acute myocardial infarction patients underwent percutaneous coronary intervention in our hospital from November 2017 to November 2019 were selected and randomly divided into the control group (50 cases) and the observation group (50 cases). The control group received routine nursing, while the observation group received targeted nursing measures on the basis of the control group. The incidence of microcirculation disturbance, left ventricular end diastolic dimension, left ventricular end systolic dimension, left ventricular ejection fraction and major adverse cardiac events were compared between the two groups. Compared with the control group (58.00 %), the incidence of microcirculation disturbance was significantly lower in the observation group (28.00 %) the difference was statistically significant (p<0.05). Compared with before nursing, left ventricular end diastolic dimension and left ventricular end systolic dimension in the two groups were significantly lower, left ventricular ejection fraction was significantly higher, the change range in the observation group was significantly greater than that in the control group and the differences were statistically significant (p<0.05). Compared with the control group (32.00 %), the incidence of mace in the observation group was significantly lower, and the difference was statistically significant (p<0.05). Active and effective nursing measures can not only effectively reduce the risk of microcirculation disturbance in emergency acute myocardial infarction patients after percutaneous coronary intervention, but also improve the cardiac function and reduce the incidence of mace, which is worthy of clinical reference.

Key words: Acute myocardial infarction, emergency, percutaneous coronary intervention, microcirculation disturbance, nursing measures

Acute myocardial infarction (AMI) is a common clinical heart disease. It is mainly due to the acute blockage of the body's coronary artery, which leads to cardiac muscle ischemia and necrosis and then damages the function of the heart. There are many factors that cause AMI, such as fatigue, eating habits, living environment, emotions, etc. AMI is mainly manifested as fever, vomiting, abdominal distension, angina pectoris, shock, etc. in clinical practice[1]. AMI has the clinical characteristics of acute onset, difficult treatment and high mortality rate and its incidence rate has been on the rise in recent years, seriously threatening human health and quality of life[2,3]. At present, coronary intervention (PCI) is mainly used to treat AMI patients in clinic, which can quickly open the occluded blood vessels of patients and significantly improve myocardial perfusion, which has been unanimously recognized in clinic[4]. In recent years, some studies have shown that some patients still have no reflow after PCI, which is not only not conducive to the recovery of cardiac function of patients, but also increases the risk of adverse cardiovascular events of patients[3]. At present, studies have confirmed that there is a close correlation between no-reflow phenomenon and coronary microcirculation disturbance[4], so clinical attention should be paid to it and active treatment should be given. At present, routine nursing such as vital signs monitoring, life nursing and health education have been carried out for patients clinically. Although certain clinical effects have been achieved, they have not

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achieved the expected clinical effects. Therefore, other efficient nursing methods need to be found. Routine nursing is not targeted, so clinical nursing measures should be formulated according to the characteristics of the disease. However, there are few studies on nursing measures for microcirculation disturbance, which is worthy of in-depth study. Therefore, the purpose of this study is mainly to explore the nursing measures of microcirculation disturbance in emergency AMI patients after PCI, aiming at improving the prognosis of emergency AMI patients. 100 emergency AMI patients who underwent PCI in our hospital from November 2017 to November 2019 were selected as research objects, and they were divided into the control group (n=50) and the observation group (n=50) according to random number table method. The control group received routine nursing, while the observation group implemented targeted nursing measures on the basis of the control group. Inclusion criteria-All patients who were diagnosed as AMI according to the diagnostic criteria of AMI in Guidelines for Diagnosis and Treatment of Acute Myocardial Infarction[5]. Patients whose visiting time not exceeding 12 h. Patients with normal cognitive function and spirit. Patients or their families signed informed consent forms. Exclusion criteria- Patients with contraindications to PCI, patients with insufficient functioning of liver and kidney, patients who were complicated with other cardiovascular diseases and patients who have received relevant nursing care. The control group received routine nursing: firstly, aid cooperation was carried out after the patients were admitted to hospital and the changes of vital signs of the patients were dynamically monitored. The patients in the study group received routine examination and at the same time, the patients and their families were given health education on relevant knowledge. After the operation, the corresponding life care and treatment were implemented according to the doctor's advice. On the basis of the control group, the observation group received targeted nursing measures: Before operation, unified professional training was given to emergency nurses to master AMI rescue knowledge, skills and puncture skills. The medical staff communicates closely with patients and their families, understand the patient's medical history, taboos, etc., and inform them of the risks and necessity of PCI surgery. Before the operation, the instruments and first-aid drugs should be prepared, and the patients should be informed of the operation process, situation and necessity of cooperation. At the same time, corresponding psychological intervention should be given to reduce or even eliminate the negative emotions of the patients, so that they can actively face the disease and cooperate with the treatment. During the operation: the staff should master relevant rescue knowledge and skills, monitor the patient's blood oxygen saturation, blood pressure, etc. throughout the process, and keep the venous channel unobstructed. During the operation, pay close attention to the patient's reaction and emotional changes, and appease their bad emotions. After the operation: The patient should stay in bed absolutely for 24 h, continuously monitor his vital signs and electrocardiogram, closely observe the blood supply of the limb end on the operation side of the patient, remove the compression elastic bandage of the radial artery 4 h after operation and prevent the occurrence of various complications. The staff should tell them to drink more water and accelerate the discharge of contrast agent. Antiplatelet and anticoagulant therapy should be carried out according to the hypercoagulable state of the patient's blood after operation. Nutritional support was given to patients, and early rehabilitation training was carried out according to their recovery. Comparison of the occurrence of microcirculation disturbance between the two groups: the index of microcirculation resistance (IMR) was used to evaluate whether the two groups had microcirculation disturbance. IMR$\geq$25 was regarded as microcirculation disturbance and IMR<25 was normal microcirculation[6]. Cardiac function- Left ventricular end diastolic dimension (LVEDD), left ventricular end systolic dimension (LVESD) and left ventricular ejection fraction (LVEF) were measured by color Doppler echocardiography (Nanjing Shidi Medical Technology Co., Ltd., model: SD60) before venous access was established and 3 mo after PCI. Major adverse cardiac events (MACE): patients were followed up for one year to observe the occurrence of emergency target vessel reconstruction, death, AMI, stent thrombosis, etc. Data processing was carried out by SPSS 18.0 statistical software. The comparison of measurement data between the two groups was expressed as ($\bar{x}$±s). T test was used. The counting data were expressed as the number of cases (n) or percentage (%), and tested by χ2. p<0.05 indicated that the difference was statistically significant. There were no significant differences in gender, age, onset time, infarct location and Killip grade between the two groups (p>0.05), as shown in Table 1. The incidence of microcirculation disturbance in the observation group was significantly lower than that in the control group (p<0.05), as shown in Table 2. There was no significant

TABLE 1: COMPARISON OF GENERAL DATA BETWEEN THE TWO GROUPS

General data		Observation group (n=50)	Control group (n=50)	t/x²	p value
Gender [n (%)]	Male	32 (64.00)	31 (62.00)	0.023	0.887
	Female	18 (36.00)	19 (38.00)		
Mean age (years old)		56.78±3.67	57.21±3.52	0.372	0.708
Mean duration of onset (h)		6.24±1.30	6.63±1.33	0.459	0.639
Infarction site [n (%)]	Inferior wall	14 (28.00)	14 (28.00)		
	Extensive anterior wall	22 (44.00)	22 (44.00)		
	Anteroseptal	8 (16.00)	8 (16.00)	0.473	0.492
	Posterior wall	2 (4.00)	3 (6.00)		
	Inferolateral	4 (8.00)	3 (6.00)		
Killip [n (%)]	Grade I	10 (20.00)	11 (22.00)		
	Grade II	26 (52.00)	25 (50.00)	0.454	0.501
	Grade III	14 (28.00)	14 (28.00)		

TABLE 2: COMPARISON OF MICROCIRCULATION DISTURBANCE BETWEEN THE TWO GROUPS [N (%)]

Item	Observation group (n=50)	Control group (n=50)	t/x²	p value
Microcirculation disturbance	14 (28.00)	29 (58.00)	6.544	0.013
Normal microcirculation	36 (72.00)	21 (42.00)		

difference in LVEDD, LVESD and LVEF between the two groups before nursing (p>0.05). After nursing, LVEDD and LVESD in the two groups decreased significantly, while LVEF increased significantly. The change range of the observation group was significantly larger than that of the control group, and the difference was statistically significant (p<0.05), as shown in Table 3. The incidence of MACE in the observation group was significantly lower than that in the control group (p<0.05), as shown in Table 4. AMI is a common clinical emergency department disease, which is caused by myocardial ischemia and hypoxia due to coronary artery closure. If it is not treated promptly and effectively, it may also cause serious complications such as heart failure, shock and arrhythmia, which have a serious impact on the quality of life of patients. PCI is the first choice for clinical treatment of AMI. Although PCI can effectively relieve the problem of coronary stenosis in patients, the clinical symptoms of some patients have not been effectively improved and their prognosis is not ideal. Some scholars have shown that PCI is related to coronary microcirculation damage to a certain extent[7]. Relevant studies show that active and effective nursing measures can effectively and significantly improve the prognosis of AMI patients after PCI[8], but there are few studies on nursing measures for microcirculation disturbance of emergency AMI patients after PCI. Microcirculation disturbance represents changes in the physical and chemical properties of blood, lumen stenosis, slow blood flow rate and even thrombosis, leading to hypoxia, ischemia or necrosis of local tissues, thus causing a variety of

clinical symptoms[9]. Li Xiaotong et al.[10] show that 57.7 % of patients with myocardial infarction have microcirculation disturbance after PCI. In this study, the incidence of microcirculation disturbance in the observation group and the control group were 28.00 % and 58.00 %, respectively, indicating that targeted nursing measures can effectively reduce the risk of microcirculation disturbance. PCI treatment of AMI patients can effectively improve the condition of myocardial blood supply, promote the recovery of myocardial tissue and then adjust serum metabolism, which is conducive to the recovery of multiple functions of the body. However, in the process of PCI treatment, if patients cannot correctly understand the relevant health knowledge and the necessity of PCI treatment, they cannot effectively cooperate with the development of treatment, while nursing measures can improve patient's understanding of diseases and treatment, further improve patient's cooperation degree and actively avoid negative factors in treatment, which is of great significance to improve the clinical treatment effect. LVEDD, LVESD and LVEF are common cardiac function indexes in clinic. LVEDD and LVESD can reflect the changes of left ventricular volume, shape and function. When it rises abnormally, it indicates that the cardiac function of the body is damaged. LVEF mainly reflects the systolic function of the left ventricle, while a decrease indicates a decrease in the systolic function of the left ventricle[11,12]. Liu Hui et al.[13] shows that microcirculation disturbance can affect the therapeutic effect of PCI; When microcirculation disturbance of patients is effectively improved, LVEDD and LVESD

TABLE 3: COMPARISON OF CARDIAC FUNCTION BETWEEN THE TWO GROUPS BEFORE AND AFTER NURSING ($\bar{x}\pm S$)

	Item	Observation group (n=50)	Control group (n=50)	t	p value
LVEDD (mm)	Before nursing	56.82±7.88	56.03±7.83	0.767	0.772
	After nursing	47.19±5.12*	53.09±6.14*	6.52	0.019
LVESD (mm)	Before nursing	35.39±5.02	35.54±5.07	0.846	0.569
	After nursing	27.64±5.14*	31.30±7.11*	5.473	0.032
LVEF (%)	Before nursing	43.54±4.11	44.08±4.05	0.931	0.472
	After nursing	56.09±7.14*	49.57±6.29*	6.529	0.017

Note: * indicates the comparison between the same group before and after nursing *$p<0.05$

TABLE 4: COMPARISON OF THE OCCURRENCE OF MACE BETWEEN THE TWO GROUPS

MACE	Observation group (n=50)	Control group (n=50)	x^2	p value
Emergency target vessel reconstruction	2 (4.00)	5 (10.00)	-	-
Death	0 (0.00)	2 (4.00)	-	-
AMI	1 (2.00)	3 (6.00)	-	-
Stent thrombus	2 (4.00)	6 (12.00)	-	-
Total occurrence	5 (10.00)	16 (32.00)	5.659	0.024

are significantly reduced, while LVEF is increased; In this study, LVEDD and LVESD decreased and LVEF increased in the two groups after nursing, but the change range in the observation group was more significant, which was basically consistent with Liu Hui's research results, indicating that certain nursing measures can improve the cardiac function of AMI patients by improving microcirculation disturbance. Surgical treatment is easy to cause micro thrombosis, which in turn leads to plaque shedding, leading to embolism of distal blood vessels and finally microcirculation disturbance. However, this study has taken targeted nursing measures for patient's blood supply and hypercoagulable state of blood, which has certain positive significance for ensuring the normal blood circulation of the body and reducing or even avoiding microcirculation disturbance. MACE is one of the main causes of poor prognosis in AMI patients[14]. Wang Xiaowei *et al.*[15] show that patients with better microcirculation have lower probability of MACE. In this study, the incidence of MACE in the observation group is significantly lower than that in the control group, which is basically consistent with the results of Wang Xiaowei's study, indicating that effective nursing measures can improve the prognosis quality of emergency AMI patients by improving microcirculation disturbance. PCI can open mechanical occlusion of epicardial vessels, at the same time, it can damage the ultrastructure and metabolic function of myocardium, resulting in a second blow to myocardial cells. Furthermore, it affects the myocardial perfusion of the body, leads to microcirculation disturbance, accelerates ventricular remodeling, expands infarct area, and is

extremely unfavorable to the prognosis of patients. Relevant nursing measures can effectively improve this condition, which can reduce the occurrence of no reflow by maintaining the normal blood circulation of the body, and further improve the overall prognosis of patients. To sum up, targeted nursing measures are not only of great significance to improve microcirculation disturbance in emergency AMI patients after PCI, but also beneficial to the recovery of cardiac function and reduce the risk of MACE, which has high clinical reference value.

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Conflicts of interest:

The authors report no conflicts of interest.

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