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Original Article

Effect of continuity of care on quality of life and medication compliance of patients with ST-segment elevation myocardial infarction

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Abstract: Objective: To investigate the effects of continuity of care (COC) on the quality of life and medication compliance of patients with ST-segment elevation myocardial infarction (STEMI). Methods: A retrospective analysis was conducted in 98 patients with STEMI that were treated in our hospital from January 2017 to December 2018. The 98 cases were assigned to a control group given routine nursing and an experimental group given routine nursing combined with COC according to different nursing approaches. The quality of life and medication compliance in the two groups were compared. Results: Higher role-emotional (RE) scores were observed in the control group after nursing (P<0.05). Compared to results before nursing as well as the control group, the experimental group obtained higher quality of life scores in the dimensions of physical functioning (PF), role-physical (RP), bodily pain (BP), general health (GH), vitality (VT), social functioning (SF), RE, mental health (MH), and better medication compliance after the implementation of COC (P<0.05). Compared to the control group, the experimental group showed a markedly lower incidence of minor bleeding and arrhythmia, a higher nursing satisfaction, and a higher excellent and good rate of cardiac function (P<0.05). The experimental group outperformed the control group in left ventricular ejection fraction (LVEF) and 6-min walking distance (P<0.05). Conclusion: COC improves the quality of life, medication compliance, and nursing satisfaction of STEMI patients, and reduces adverse events.

Keywords: Continuity of care, ST-segment elevation myocardial infarction, quality of life, medication compliance

Introduction

ST-segment elevation myocardial infarction (STEMI) is a manifestation of myocardial infarction (MI) presenting with ST-segment elevation by electrocardiogram. Its occurrence is mainly attributed to bleeding or rupture of plaques in the coronary arteries in a short time, or the development of thrombosis in blood vessels, which results in rapid ischemia and hypoxia. It eventually gives rise to myocardial cell necrosis and seriously damages the patient's cardiac structure and function [1-4]. At present, percutaneous coronary intervention (PCI) is the mainstay in the treatment of STEMI and has been extensively applied in clinical practice. As cardiovascular events persist after PCI, continuous administration of the antiplatelet drug tegretol is required to prevent adverse cardiovascular events. Treatment guidelines recommend the administration of tegretol for no less than 1 year after PCI [3]. However, the prognosis is compromised among patients with poor medication compliance due to age, education level, economic factors, and family factors. Therefore, a vacuum in care occurs as STEMI patients typically recover at home a few days after PCI. STEMI, characterized by high morbidity and mortality, causes serious adverse effects on the prognosis and quality of life of patients, so nursing care is essential to the prognosis and recovery of patients [5-8].

Continuity of care (COC) is an improvement in traditional nursing that extends the nursing work from the hospital to the home, freeing up professional nursing processes that used to be limited to the hospital. Even if the patient is discharged, the nursing staff will still provide corresponding nursing services according to the actual needs of the patient. This nursing model is considered favorable for patients with STEMI.

Accordingly, 98 patients with STEMI admitted to our hospital were enrolled in this study to evaluate the effect of COC on their prognosis, quality of life, and medication compliance. This study innovatively used new nursing interventions to improve prognosis and compliance, which avoided a care vacuum for patients.

Data and methods

General data

Ninety-eight patients with STEMI admitted to our hospital from January 2017 to December 2018 were identified as research subjects and assigned into a control group and an experimental group according to different nursing approaches. Of the 98 patients, the experimental group consisted of 29 males and 20 females, aged 50-74 years old, with an average age of (61.8±6.5) years old. The control group consisted of 28 males and 21 females, aged 51-73 years old, with an average age of (60.3±4.5) years old.

Inclusion criteria

(1) Patients who met the clinical diagnostic criteria for STEMI; (2) Patients who underwent PCI; (3) Patients with complete medical records; (4) Patients with a life expectancy over 1 year; (5) This study was approved by the hospital ethics committee, with an ethics approval number of 2016-12-17; the patients and their family members accepted the nursing intervention scheme and signed the informed consent after being informed of the purpose and process of this study.

Exclusion criteria

(1) Patients with brain, kidney, liver, or other organ diseases; (2) Patients with other myocardial diseases; (3) Patients who had mental or other cognitive impairment or who refused to cooperate with the study; (4) Patients who were pregnant; (5) Patients with malignant tumors; (6) Patients with typical bundle branch block; (7) Patients in cardiogenic shock.

Methods

Both groups received both PCI and antiplatelet drugs after surgery for treatment. Preoperatively, the control group was provided with routine nursing interventions according to the patients' conditions. Patients in the experimental group received the COC scheme in addition to routine nursing interventions: (1) The detailed medical records of all patients in the experimental group were collected, including name, gender, age, education level, comorbidities, family members, previous medical history, and medication status. (2) Postoperative changes in the patients' condition were comprehensively evaluated, and nursing measures conducive to improving postoperative quality of life and recovery were formulated according to the specific nursing needs of patients, including dietary guidance, activity guidance, psychological intervention, and health education. In addition, nursing staff actively communicated with patients and their families in the nursing process and encouraged family members to offer the patients more emotional support [9-11]. (3) After discharge, the patients were regularly followed up by telephone every week to know about their medication and recovery. Patients and their families were instructed to review regularly. Moreover, MI-related health knowledge was released on the WeChat public account for the patients to improve their disease awareness, and their questions were promptly answered.

Outcome measures

Primary indicators

Quality of life: The MOS short-form 36 Item Health Survey (SF-36) was used to assess the quality of life of the patients before and after the nursing, which includes: physical functioning (PF), role-physical (RP), bodily pain (BP), general health (GH), vitality (VT), social functioning (SF), role-emotional (RE), and mental health (MH), each with a score of 100 points. A higher score indicates a better quality of life.

Medication compliance: A medication compliance questionnaire developed by the hospital was employed to assess the medication compliance of the patients. The questionnaire mainly involved the name of the drugs, the dosage, the method of medication, the time of medication, and the efficacy of the medication, with a higher score representing a better medication compliance.

Adverse cardiovascular events: The incidence of adverse cardiovascular events after nursing was recorded and calculated in both groups.

Table 1. General data in the two groups

	Experimental group (n = 49)	Control group (n = 49)	t/X^2	P
Mean age	(61.8±6.5)	(60.3±4.5)	1.3282	0.1873
Past medical history			0.0419	0.838
Hypertension	8 (16.33)	9 (18.37)		
Diabetes	13 (26.53)	11 (22.45)		
None	28 (57.14)	29 (59.18)		
Smoking			0.1633	0.686
Yes	26 (53.06)	24 (48.98)		
No	23 (46.94)	25 (51.02)		
Drinking			0.1922	0.661
Yes	33 (67.35)	35 (71.43)		
No	16 (32.65)	14 (28.57)		
Sex			0.0419	0.838
Male	29 (59.18)	28 (57.14)		
Female	20 (40.82)	21 (42.86)		
Place of residence			0.0568	0.812
Urban area	38 (77.55)	37 (75.5)		
Rural area	11 (22.45)	12 (24.49)		

Recovery of cardiac function: The recovery of cardiac function of patients was graded as excellent, good and poor. Excellent recovery corresponded to significantly ameliorated and effectively controlled symptoms after nursing. Good recovery was considered if the symptoms after nursing were relieved. Poor recovery was considered if the symptoms had little improvement or deterioration. The excellent and good rate = (excellent + good) cases/total cases × 100%.

Basic clinical conditions: The left ventricular ejection fraction (LVEF) of patients was measured with the color Doppler ultrasound before discharge. The reference value of patients' resting LEVF was 55-65%, and cardiac insufficiency was indicated if the LEVF was less than 50%. The 6-min walking distance test was used to evaluate the walking ability of patients. A 6-minute timer was set, and the patient was timed when the patient walks from the starting line. Talking, running, or jumping was forbidden during the walk. The 6-minute walking distance of the patient was recorded.

Secondary indicators

Nursing satisfaction: The hospital's self-made nursing satisfaction survey questionnaire was used to understand the patient's satisfaction, which includes three levels: very satisfied, satisfied, and dissatisfied. Total nursing satisfaction = (very satisfied + satisfied) cases/total number of cases × 100%.

Statistical analyses

SPSS20.0 was used for data analysis, and GraphPad Prism 7 (GraphPad Software, San Diego, USA) was used for image rendering. Counted data were compared using the chi-square test. For measured data, independent sample t-test was used for comparison between groups and paired t-test was used for comparison within groups. P<0.05 indicated a significant difference.

Results

Comparison of general clinical data

No notable differences (all P>0.05) were found in general data between the two groups, including age, gender and medical history, **Table 1**.

Comparison of the quality of life

In the control group, the RE score increased significantly after nursing intervention (P<0.05), and no significant disparity was obtained in other dimensions concerning the quality of life. After the implementation of COC, the experimental group obtained higher scores of PF, RP, BP, GH, VT, SF, RE, and MH than those before nursing and the control group (P<0.05) **Table 2**.

Comparison of medication compliance

The medication compliance scores of patients in the control group before and after routine nursing intervention were (7.14±1.39) and (8.01±2.15), respectively, and those of patients in the experimental group before and after COC nursing intervention were (7.25± 1.46) and (9.25±3.14), respectively.

The experimental group after the implementation of COC exhibited better medication compliance than before nursing and better than the control group (P<0.05) **Figure 1**.

Table 2. Comparison of the quality of life between the two groups before and after nursing (x±s)

	Control group (n = 49)		Experimental group (n = 49)			
	Before nursing intervention	After intervention	Before nursing intervention	After intervention	t	P
PF	85.64±8.24	86.35±9.05	85.57±8.21	90.46±7.86*	2.8539	0.0054
RP	61.33±18.39	60.88±21.34	61.39±18.32	74.67±12.57*	3.9648	0.0002
BP	78.76±14.67	79.46±15.62	78.69±14.65	88.74±10.76*	3.6675	0.0004
GH	62.41±14.56	63.24±13.99	62.37±14.55	63.71±15.23*	0.4220	0.0374
VT	53.65±17.16	55.13±17.65	53.68±17.17	63.54±13.21*	3.0191	0.0033
SF	78.14±19.22	80.13±18.65	78.21±19.25	89.65±10.86*	3.4334	0.0009
RE	58.43±26.31	81.65±17.72*	58.34±26.24	83.24±15.96*	5.3779	0.000
MH	66.45±16.48	68.45±18.32	66.51±16.51	81.75±12.76*	4.8447	0.000

*indicates P<0.05 when compared with data before nursing intervention. The t-value and *P*-value are the statistical values for the comparison of quality of life between the two groups after nursing.

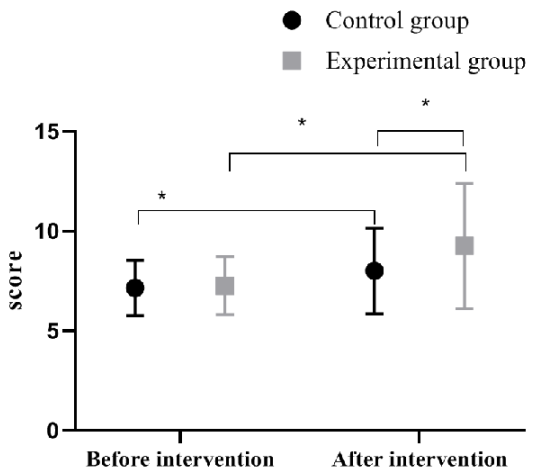

Figure 1. Comparison of medication adherence between the two groups (x±s). Note: The abscissa indicates before and after nursing, and the ordinate indicates the scores. The medication compliance of patients in the control group before and after routine nursing was significantly different (t = 2.3787, *P = 0.0194). A significant difference in medication compliance of the experimental group before and after COC intervention (t = 4.0429, *P = 0.0001). A significant difference in medication compliance between the two groups of patients after nursing (t = 2.2809, *P = 0.0248).

Comparison of the occurrence of adverse cardiovascular events

The total incidence of adverse cardiovascular events in the two groups was different (P = 0.02). Nonetheless, no great disparity was observed in other adverse cardiovascular events, except for a lower incidence of minor bleeding and arrhythmia in the experimental group than the control group (P<0.05) **Table 3**.

Comparison of nursing satisfaction

A higher total nursing satisfaction rate was obtained in the group adopting COC in contrast to the group given conventional nursing (P<0.05) **Table 4**.

Comparison of recovery of cardiac function

The experimental group had a higher excellent and good rate of cardiac function than the control group (P<0.05) **Table 5**.

Comparison of basic clinical conditions

The experimental group outperformed the control group in terms of LVEF and 6-min walking distance (P<0.05) **Table 6**.

Discussion

The onset of ST-segment elevation myocardial infarction (STEMI) is acute, with patients presenting MI in the absence of preconditioning for myocardial ischemia. In clinical treatment, vascular recanalization is mainly carried out through percutaneous coronary intervention (PCI). This treatment method is considered effective, so it has been extensively employed in clinical application [12-15]. Notwithstanding the effectiveness of intraoperative treatment, patients are predisposed to adverse cardiovascular events postoperatively, which entails continuous postoperative treatment with antiplatelet drugs. Moreover, low medication compliance is frequently observed in the later stage of recovery, which compromises the patients' quality of life. PCI has significant short-term

Table 3. Occurrence of adverse cardiovascular events in the two groups [n (%)]

	Control group (n = 49)	Experimental group (n = 49)	X^2	P
Minor bleeding	13 (26.53)	4 (8.16)	5.7647	0.016
Arrhythmia	8 (16.33)	2 (4.08)	4.0091	0.045
Angina pectoris	3 (6.12)	3 (6.12)	0.000	1.000
Thrombocytopenia	2 (4.08)	0 (0)	2.0417	0.153
Relapse	2 (4.08)	1 (2.04)	0.3439	0.558
Death	1 (2.04)	0 (0)	1.0103	0.315
Total	29 (59.18)	10 (20.41)	3.451	0.002

Table 4. Comparison of nursing satisfaction between the two groups [n (%)]

Group	Dissatisfied	Satisfied	Very satisfied	Total Satisfaction rate
Control group (n = 49)	14 (28.57)	22 (44.90)	13 (26.53)	35 (71.43)
Experimental group (n = 49)	2 (4.08)	15 (30.61)	32 (65.31)	47 (95.92)
X^2				10.7561
P				0.001

Table 5. Comparison of the recovery of cardiac function between the two groups [n (%)]

Group	Poor	Good	Excellent	Good and excellent rate
Control group (n = 49)	7 (14.29)	22 (44.90)	20 (40.82)	42 (85.71)
Experimental group (n = 49)	1 (2.04)	15 (30.61)	33 (67.35)	48 (97.96)
X^2				4.9000
P				0.027

Table 6. Comparison of the basic clinical conditions between the two groups (x±s)

Group	n	LVEF (%)	6-min walking distance (m)
Control group (n = 49)	49	47.08±5.74	281.11±58.80
Experimental group (n = 49)	49	56.21±6.67	377.03±60.85
X^2		7.2627	7.9350
P		<0.001	<0.001

efficacy in STEMI patients; Postoperative lifestyle, proper self-management, standardized medication, and stent maintenance are the keys to the reduction of adverse cardiovascular events [16]. Therefore, the improvement of patients' compliance, the reduction of adverse cardiovascular events, and the enhancement of quality of life after PCI are the main concerns of health care professionals.

The nurse-led nursing intervention effectively alleviates patients' anxiety, and improves their compliance and quality of life by providing health guidance, psychological guidance, medication guidance, and follow-up [11, 12]. Insufficient awareness of STEMI, misunderstanding about the complete cure of STEMI by PCI, lack of effective self-management, and poor medication compliance are the main causes of cardiovascular adverse events in patients after PCI [13]. In this study, a COC team was established to develop individualized nursing measures by conducting a comprehensive assessment of the physical condition, psychological status, family status, and compliance behavior of PCI patients prior to discharge from the hospital. COC is the continuous extension of nursing work from the hospital to the patients' home, breaking the original limitations of nursing services [16-19]. Currently, patients' quality of life after PCI is extensively studied abroad. Davierwala et al. [17] found that PCI improved the quality of life in most patients, but still 27% of patients had poor quality of life after PCI, and there are few relevant studies in China. Herein, higher RE scores were observed in patients in the control group after nursing intervention. The experimental group after the

implementation of COC obtained higher scores of PF, RP, BP, GH, VT, SF, RE, and MH, and better medication compliance than those before nursing intervention and in the control group. The incidence of minor bleeding and arrhythmia in the experimental group was lower than that in control group. The overall nursing satisfaction of the group given COC exceeded the group given conventional nursing in this study. Moreover, the experimental group outperformed the control group with regard to the cardiac function, the LVEF, and 6-min walking distance. The results demonstrated the essential role of COC in supervising patients in extended nursing care, effectively improving patients' medication compliance and quality of life. The results of this study were consistent with the conclusions obtained by Arora [20] et al., who revealed that COC for patients with MI effectively eliminated the patients' negative emotions, and improved their compliance and prognosis, suggesting that COC for patients with STEMI could enhance patients' quality of life and medication compliance.

In summary, COC enhances the quality of life, physical, social, and mental state, and vitality of STEMI patients, and relieves their physical pain. Moreover, through continuous follow-up interventions, COC enhances patients' medication compliance, reduces the occurrence of adverse events, promotes patients' satisfaction, and boosts the harmonious development of the doctor-patient relationship. The limitations of this study are the absence of multiple-center studies and a short intervention period. Long-term efficacy remains unclear and requires exploration in future studies.

Disclosure of conflict of interest

None.

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