

Original Article

Effects of comprehensive care in patients with multiple myeloma with cardiac dysfunction

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Received November 13, 2020; Accepted December 24, 2020; Epub May 15, 2021; Published May 30, 2021

Abstract: Objective: To explore the effect of comprehensive care on cardiac and renal function indices, treatment compliance, self-care ability and quality of life in patients with multiple myeloma combined with cardiac dysfunction. Methods: A total of 53 patients diagnosed with multiple myeloma combined with cardiac dysfunction admitted to our hospital were enrolled and divided into the control group (n=25) and the experimental group (n=28) by the method of random number table. Patients in the control group were given routine nursing care, while patients in the experimental group were given comprehensive care on the basis of the routine nursing care of the control group. The changes in cardiac and renal function indices, treatment compliance, self-care ability, and quality of life were observed after intervention of different nursing methods in the two groups. Results: The levels of left ventricular ejection fraction, brain natriuretic peptide, N-terminal pro-brain natriuretic peptide, glomerular filtration rate, serum creatinine, and uric acid in the experimental group were significantly improved after intervention, showing significant differences between the two groups ($P<0.05$). The treatment compliance in the experimental group (92.86%) was significantly higher than that in the control group (68%). The scores of self-care ability and quality of life in the experimental group were significantly higher than those in the control group after intervention ($P<0.05$). Conclusion: Comprehensive care can significantly help to improve cardiac and renal functions, treatment compliance, self-care ability and quality of life in patients with multiple myeloma combined with cardiac dysfunction, which is of great clinical significance.

Keywords: Multiple myeloma, renal function, treatment compliance, self-care ability, quality of life

Introduction

Multiple myeloma (MM) is a hematologic disease with malignant proliferation of plasma cells derived from B lymphocytes, and has become the second hematologic malignancy after leukemia [1]. The initial symptoms include bone pain, anemia, reduced renal function, etc. A very small number of patients will develop hypercalcemia. Accordingly, the first-visit department of most patients with MM is not Hematology Department, and the care of the disease is delayed. Currently, combined drug therapy has become the first choice for patients with MM [2]. However, due to the complex pathogenesis, MM still cannot be cured completely. As patient's immune function becomes more and more disordered, the drug response and the duration of the drug effect decrease [3-5].

The main population suffering from MM is the elderly, and men are more likely to develop the disease than women. Survival in patients with conventional chemotherapy is only 2-3 years. With the use of protease preparations, immune preparations and hematopoietic stem cell transplantation, the survival period has been significantly prolonged, but these types of treatment can only delay the progression of the disease, and most patients will still die from relapses and drug resistance. With the prolongation of the treatment period, many patients will experience negative emotions, reduced treatment compliance, drug side effects and complications, leading to a significant decline in quality of life.

MM is related to amyloidosis, especially myocardial amyloidosis [6]. When myocardial amyloidosis occurs, patients will have the symp-

Effect of comprehensive care in multiple myeloma with cardiac dysfunction

toms such as arrhythmia and even cardiac failure [7]. At the same time, due to the use of chemotherapy or targeted therapy drugs, patients will also have adverse reactions such as cardiac and renal damage during the treatment, and the risk of myocardial infarction may be increased [8, 9]. The comorbidity of cardiovascular disease increases mortality in patients with MM [10].

Comprehensive care is a modern nursing model based on the concept of holistic nursing, which emphasizes the comprehensiveness and integrality of nursing measurements. Patients with MM have a long time of treatment and rehabilitation, so it is necessary to provide them with more professional and efficient comprehensive care so as to improve their quality of life.

This study aimed to apply comprehensive care model to the treatment process of patients of MM with cardiac dysfunction and analyze its effects, so as to provide a theoretical basis for improving cardiac and renal function, treatment compliance, self-care ability, and quality of life of patients.

Materials and methods

General information

A total of 53 patients with MM combined with cardiac dysfunction admitted to our hospital from May 2019 to May 2020 were enrolled as the research objects, and all patients met the IMWG diagnostic criteria for MM [11]. The patients included 32 males and 21 females.

Exclusion criteria: patients combined with other malignant tumors, severe hepatic, renal and pulmonary dysfunction, cognitive dysfunction, and plasmacytoma were excluded.

The 53 patients were divided into the control group (n=25) and the experimental group (n=28) by the method of random number table. The control group included 15 males and 10 females, with an average age of (62.20±6.42) years, whereas the experimental group included 17 males and 11 females, with an average age of (63.48±7.92) years. There was no significant difference in general data such as gender, age and IBM between the two groups ($P>0.05$).

Personal files of 53 subjects were established, including name, gender, age, contact number,

and home address. Informed consent forms were signed voluntarily by the patients. This study has been approved by the Ethics Committee of Huzhou Cent Hospital, Affiliated Cent Hospital Huzhou University.

Interventional methods

Both groups of patients were treated with a combined chemotherapy regimen of bortezomib (Velcade bortezomib for injection: Xi'an Yangsen Pharmaceutical Co., Ltd., SFDA approval number: J20171067) + thalidomide (Thalidomide tablets: Changzhou Pharmaceutical Factory Co., Ltd., SFDA approval number: H32026129) + dexamethasone (dexamethasone sodium phosphate for injection: Chengdu Tiantaishan Pharmaceutical Co., Ltd., SFDA approval number: H20052126).

Patients in the control group were given routine nursing care, including informing patients of precautions and giving medication and dietary guidance.

Patients in the experimental group were given comprehensive care on the basis of the routine nursing care of the control group. The specific measures were as follows.

Building a professional nursing team: A professional nursing team consisting of 1 doctor, 3 nurses, 2 psychological counselors and 1 nutritionist was responsible for the whole process of medical care and follow-up. According to each patient's condition, family situation, individual status, etc., a personalized nursing plan was developed.

The nursing team members actively communicated with patients and their families to build mutual trust and facilitate the subsequent nursing work.

Health education: After discharge, the nursing guidance manual was issued to the patients to introduce disease-related knowledge and measures to prevent complications and list successful cases of cooperative treatment plan, so that the patients could fully understand the condition, enhance confidence, and improve treatment compliance.

Psychological counseling: As MM could not be cured and the treatment process was long, patients were prone to anxiety and irritability

Effect of comprehensive care in multiple myeloma with cardiac dysfunction

due to pain and physical discomfort during chemotherapy. The nursing team members could strengthen communication with patients, keep abreast of changes in their emotions, encourage them to communicate with relatives, friends, and fellow sufferers, and urge family members to provide more understanding and support to them, so as to improve their negative emotions.

Dietary guidance: Patients with MM were prone to symptoms such as anemia, leukopenia, and malnutrition during the treatment. The nutritionists in the nursing team could set up a high-protein, high-fiber, and easy-to-digest diet plan for the patients based on their personal dietary habits. For patients with low platelets, hard foods were prohibited to prevent intestinal bleeding.

Medication guidance: For patients with bone pain, gently massage and comfortable position can be used to alleviate the pain. Patients were instructed to relax their emotions in daily life and divert painful attention with recreational activities such as listening to music and watching TV. Patients with severe pain, cardiac and renal dysfunction should be given appropriate drug intervention.

Outcome measurement and evaluating standards

Cardiac function indices: Left ventricular ejection fraction (LVEF) is related to the contractility of myocardium. Weakened myocardial contractility means the smaller stroke volume and ejection fraction. When a patient develops cardiac failure, the tension of ventricular wall and the secretion of brain natriuretic peptide (BNP) in the ventricular muscle are increased, resulting in the increase of BNP in plasma. The degree of increase is positively correlated with the severity of cardiac failure. When patient's heart suffers traction and pressure changes, N-terminal pro-brain natriuretic peptide (NT-proBNP) begins to secrete to reduce the cardiac volume load, at this time patient's heart is in a state of cardiac failure. Two-dimensional echocardiography was used to measure the LVEF, BNP, and NT-proBNP in the two groups to evaluate the cardiac function before and after intervention [12, 13].

Renal function indices: Glomerular filtration rate (GFR) reflects the ability of kidneys to drain and detoxify. When a patient's renal function is

abnormal, GFR will decrease. Creatinine is a product of human muscle metabolism. When a patient's renal function is abnormal, the concentration of serum creatinine (Scr) will increase due to the decrease of the capacity of glomerular filtration. Uric acid is the end product of purine metabolism. 2/3-3/4 of uric acid is excreted by kidneys. When a patient's renal function is abnormal, uric acid value will increase. Two-dimensional echocardiography was used to measure the GFR, Scr, and uric acid in the two groups to evaluate renal function before and after intervention [14].

Treatment compliance: The questionnaire compiled in our hospital was used to evaluate treatment compliance in the two groups after intervention. The questionnaire involved three aspects: taking medications on time and in quantity, regular review, and consciously cooperating with doctor's treatment plan. Each item was ranked as: non-compliance, compliance, and very compliance.

Self-care ability: The exercise of self-care agency scale (ESCA scale) was used to evaluate the self-care ability in the two groups before and after intervention. The scale includes four items, namely self-care responsibility, health knowledge, self-care concept, and self-care skills with a 5-point scoring (0-4 points). A score of 4 indicates very consistent, while a score of 0 indicates completely inconsistent. The score of scale increases with the increase of self-care ability [15, 16].

Quality of life: The GQOL-74 scale was used to evaluate the quality of life of patients before and after intervention, which includes physical, psychological, social, and material life. The higher score means the better quality of life [17, 18].

Statistical analysis

SPSS 17.0 software was used for data analysis. The measurement data were expressed as ($\bar{x} \pm s$) and analyzed by T test. $P < 0.05$ was considered statistically significant.

Results

Comparison of general clinical data between the two groups

There was no statistical difference in gender, age, body mass, etc. between the two groups ($P > 0.05$) (**Table 1**).

Effect of comprehensive care in multiple myeloma with cardiac dysfunction

Table 1. Comparison of general clinical data between the two groups ($\bar{x} \pm s$)/[n (%)]

General data		Control group (n=25)	Experimental group (n=28)	t/X ²	P
Gender	Male	15	17	-3.000	0.205
	Female	10	11		
Average age (years)		62.20±6.42	63.48±7.92	-0.652	0.520
Average weight mass (kg)		59.80±6.84	60.36±7.65	-0.240	0.813

Analysis of changes in cardiac function indices before and after intervention

There was no significant difference in the levels of LVEF, BNP, and NT-proBNP between the control group and the experimental group before intervention ($P>0.05$). There were significant differences in the levels of LVEF, BNP, and NT-proBNP between the control group [(41.52±3.29), (111.49±4.96), (561.52±11.15)] and the experimental group [(52.38±4.03), (91.05±4.38), (482.43±12.94)] after intervention ($P<0.05$) (**Figure 1**).

Analysis of changes in renal function indices before and after intervention

There was no significant difference in the levels of GFR, Scr, and uric acid between the control group and the experimental group before intervention ($P>0.05$). There were significant differences in the levels of GFR, Scr, and uric acid between the control group [(56.22±10.13), (123.76±35.24), (362.74±41.66)] and the experimental group [(71.64±12.38), (94.31±25.83), (300.58±36.17)] after intervention ($P<0.05$) (**Figure 2**).

Analysis of treatment compliance after intervention

After intervention, the overall ratio of treatment compliance in the experimental group was 92.86%, which was significantly higher than that of 68% in the control group (**Table 2**).

Analysis of self-care ability after intervention

There were significant differences in the scores of the four items of self-care responsibility, health knowledge, self-care concept, and self-care skills between the control group [(14.36±2.97), (45.93±11.17), (21.36±3.25), (29.84±5.71)] and the experimental group [(21.87±3.64), (64.79±13.20), (27.88±4.05), (38.63±

6.72)] after intervention ($P<0.05$) (**Figure 3**).

Analysis of the quality of life after intervention

There were significant differences in the scores of physical, psychological, social, and material life between the

control group [(53.63±6.74), (53.18±7.54), (49.87±3.43), (55.28±6.13)] and the experimental group [(61.07±5.49), (61.84±4.31), (58.72±5.26), (67.13±5.30)] after intervention ($P<0.05$) (**Figure 4**).

Discussion

With the aging of the population, the number of patients with MM increases year by year. In the process of treatment, patients often suffer from cardiac and renal damage, bone pain, pathological fractures, infections, anemia and other side effects, which seriously affect the quality of life of patients [19, 20]. Patients with MM combined with cardiac dysfunction have poor prognosis, and more than half of them will die from cardiac failure or cardiac arrhythmia. It usually takes about 6 months from the onset of the symptoms of cardiac failure to death [21]. Echocardiography or NMRI is conducive to the early diagnosis of patients with MM combined with cardiac dysfunction, and the improvement of the diagnostic accuracy, so as to carry out timely and targeted treatment [22, 23]. Drugs cannot completely alleviate the clinical symptoms. Meanwhile, adverse reactions and drug resistance occur in patients during long-term drug use, resulting in reduced treatment compliance, which is not conducive to good prognosis of patients [24]. Studies have shown that the education of nurses plays a key role in the nursing process of patients with MM, and nurses can improve the prognosis of patients by timely intervention in aspects such as bone health of patients [25]. Providing good care for patients from the beginning of diagnosis to treatment can help patients with MM maintain good health and improve their quality of life [26]. Therefore, the key task of care for patients with MM is to encourage them to face life positively and improve negative emotions, treatment compliance, self-care ability, and the quality of life through personalized and comprehensive care [27, 28].

Effect of comprehensive care in multiple myeloma with cardiac dysfunction

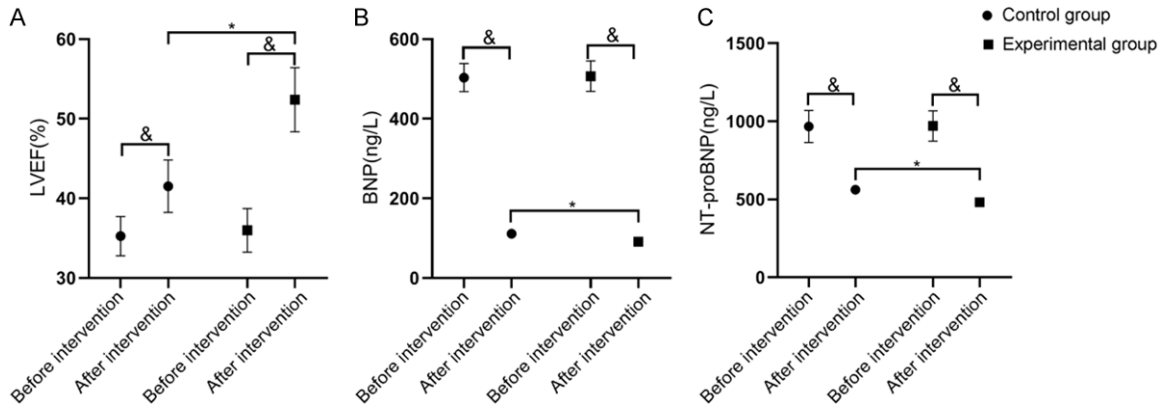


Figure 1. Analysis of changes in cardiac function indices before and after intervention. The levels of LVEF in the two groups after intervention were significantly higher ($P<0.05$) and the levels of BNP and NT-proBNP were significantly lower than those before intervention ($P<0.05$). There were significant differences between the two groups after intervention ($P<0.05$). & indicates that the difference before and after intervention was statistically significant. * indicates that the difference between the two groups was statistically significant.

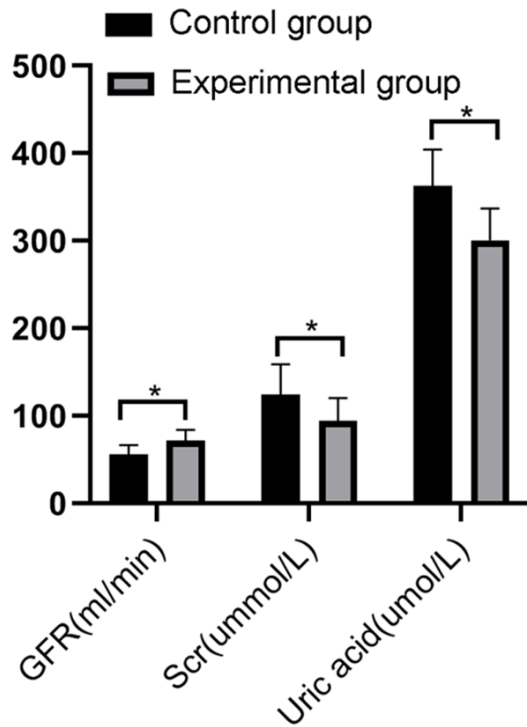


Figure 2. Analysis of changes in renal function indices after intervention. After intervention, the levels of GFR in the experimental group were significantly higher and the levels of Scr and uric acid were significantly lower than those in the control group ($P<0.05$). There were significant differences between the two groups after intervention ($P<0.05$). * indicates that the difference between the two groups was statistically significant.

This study introduced comprehensive care for patients with MM combined with cardiac dys-

function. Health education was provided to patients by professional nursing team, so that patients could better understand the condition and increase confidence. Besides, timely psychological counseling for patients with negative emotions was provided. Patients were encouraged to communicate with family members and friends and distract attention with recreational activities to reduce psychological pressure. Personalized guidance on diet and medication was given to improve treatment effect and their quality of life according to their physical condition. The results showed that the levels of LVEF in the two groups after intervention were significantly higher and the levels of BNP and NT-proBNP were significantly lower than those before intervention ($P<0.05$). There were significant differences in the levels of LVEF, BNP and NT-proBNP between the two groups after intervention ($P<0.05$). The levels of GFR in the two groups after intervention were significantly higher and the levels of Scr and uric acid were significantly lower than those before intervention ($P<0.05$). There were significant differences in the levels of GFR, Scr and uric acid between the two groups after intervention ($P<0.05$). The treatment compliance of 92.86% in the experimental group was significantly higher than that of 68% in the control group. The scores of ESCA and GQOL-74 scales in the experimental group were significantly higher than those in the control group after intervention ($P<0.05$). The results revealed that comprehensive care for patients with MM with car-

Effect of comprehensive care in multiple myeloma with cardiac dysfunction

Table 2. Comparison of treatment compliance after intervention [n (%)]

Group	Cases	Very compliance	Compliance	Non-compliance	Ratio of compliance
Control group	25	10 (40.00)	7 (28.00)	8 (32.00)	17 (68.00)
Experimental group	28	20 (71.43)	6 (21.43)	2 (7.14)	26 (92.86)

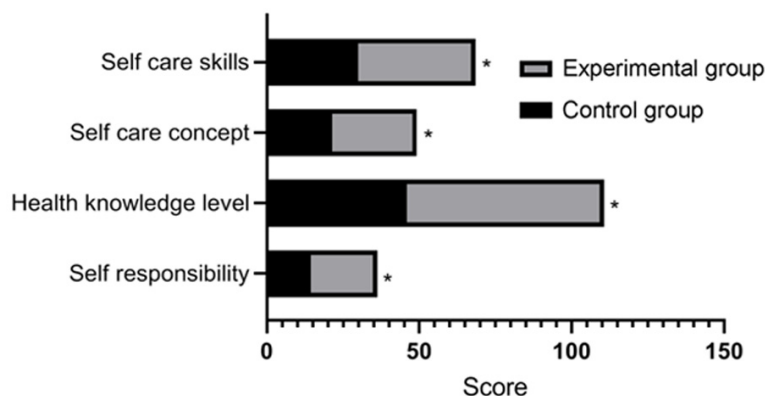


Figure 3. Analysis of self-care ability after intervention. The scores of the four items in the experimental group were higher than those in the control group after intervention ($P < 0.05$). * indicates that the difference between the two groups was statistically significant.

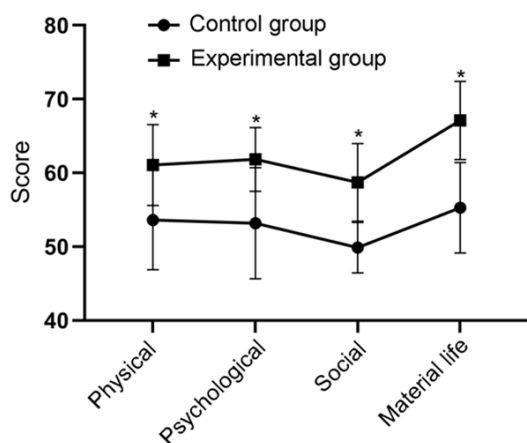


Figure 4. Analysis of quality of life after intervention. The scores of physical, psychological, social, and material life in the experimental group were higher than those in the control group after intervention ($P < 0.05$). * indicates that the difference between the two groups was statistically significant.

diac dysfunction was helpful to improve cardiac and renal function, treatment compliance, self-care ability, and quality of life.

In conclusion, comprehensive care is worthy of clinical application. Instead of routine nursing care, the innovation of this study was to introduce comprehensive care model into the nurs-

ing work of patients with MM combined with cardiac dysfunction, which emphasized on patient's medication, physical, mental and psychological status throughout whole process, so as to avoid careless omission that may lead to patients' loss of confidence in treatment and affect the treatment effect. Through efforts to provide patients with more comprehensive and efficient nursing experience, cardiac and renal function, treatment compliance, self-care ability, and quality of life were improved.

The deficiencies of this study were as follows: (1) The small sample and strong region made the research results lack of universality. (2) The follow-up time of patients with MM combined with cardiac dysfunction was insufficient, and the cardiac and renal function indices monitored were incomplete. In view of the above deficiencies, a study with larger sample size, multiple regions and more comprehensive indices should be conducted to provide a more detailed theoretical basis for the care of patients with MM combined with cardiac dysfunction in the future.

Acknowledgements

This work was supported by Abnormal expression of HIF-1 α and HIF-1 β in multiple myeloma patients with positive 1q21 amplification and their relationship with prognosis (No. 2019GY-28).

Disclosure of conflict of interest

None.

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Effect of comprehensive care in multiple myeloma with cardiac dysfunction

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Effect of comprehensive care in multiple myeloma with cardiac dysfunction

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