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Methodology Article

Effect of Mindfulness-decompression on Stresspsychology and Sleep of Heterogeneous Hematopoietic Stem Cell Transplantation Donors

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Abstract: Objective: To investigate the effect of mindfulness decompression on psychological status and sleep quality of allogeneic hematopoietic stem cell transplantation donors. Methods: From January 2017 to June 2019, 86 donors of allogeneic hematopoietic stem cell transplantation in our hospital were selected and divided into the control group and observation group with 43 cases in each group according to random numbertable method. The control group received routine nursing during the perioperative period, while the observation group received psychological intervention of mindfulminant decompression on the basis of routine nursing. Before and after the intervention, the emotional state and sleep quality of the donors were evaluated by the self-rating anxiety scale (SAS), self-rating depression Scale (SDS) and Pittsburgh Sleep Quality Index (PSQI). Results: The preoperative SAS, SDS and PSQI scores were not significantly different. (P>0.05). however, the post treamtment score of SAS, SDS and PSQI in observation group were significantly lower than the control group (P<0.05). Conclusion: Mindfulness decompression can significantly improve preoperative anxiety and depression of allogeneic hematopoietic stem cell transplantation donors, and improve sleep quality, which is worth popularizing in clinical practice.

Keywords: Mindfulness-Based Stress Reduction, Heterogeneous, Hematopoietic Stem Cell Transplantation, Stress Psychology

1. Introduction

Allogeneic peripheral blood stem cell transplantation (Peripheral blood stem cell transplantation) is one of effective methods to treat benign and malignant hematological diseases [1]. It is necessary to find donors matched with human leukocyte antigen (HLA) before transplantation, to reduce graft rejection and improve the safety of transplantation. However, the probability of complete matching of HLA matching is very low, according to the genetic law. Perfectmatching and complete mismatch of siblings accounted for 25% of the total odds 50% accounted for half of the odds. In the international arena, a matched donor was found in a non-consanguineous population by establishing a bone marrow bank. Still, its HLA consistency rate was only 1.7/10 million [2]. But some relatives have to participate in the match because of family pressure. When they know that their blood match is successful, their hearts will inevitably produce fear, contradiction, and uneasiness. On the one hand, they want to donate hematopoietic stem cells to cure their relatives, on the other hand, they are afraid that the donation of hematopoietic stem cells will do harm to themselves, and the high cost of medical treatment for patients will lead to stress psychology. Negativeemotions may occur. Especially when the operation date is confirmed, the donor will suffer from bad mood and anxiety, depression and sleep quality problems during the perioperative period. Sleep disorders can increase the secretion of adrenaline and catecholamine, increase heart rate and respiration, increase blood pressure, constriction of blood vessels, and increase of

platelet viscosity [3]. Mindfulness-Based Stress Reduction (MBSR) is an emotional and stress management method based on mindfulness meditation. It is widely applied to relieve stress and emotional management based on conscious awareness, attention to the present, and no evaluation of the core idea [4]. And achieved good results [5]. This study applies mindset decompression to donors of allogeneic hematopoietic stem cell transplantation to observe the impact of perioperative stress on their stress and sleep quality. The results are reported below.

2. General Data and Methods

2.1. General Data

Baseline dataA total of 86 donors who received allogeneic hematopoietic stem cell transplantation in the hematology department of our hospital from January 2017 to June 2019 were selected, including 29 siblings, 17 sisters, 16 fathers and 4 mothers. There were 12 sons and 8 daughters. Among them, 63 were voluntary donors and 23 were due to family pressure. The inclusion criteria: (1) matched donors with successful allogeneic hematopoietic stem cell transplantation; (2) over 16 years old; (3) with full comprehension and ability to make own decision; and (4) Perioperative self-rating anxiety scale ((SAS))≥ 50 and self-rating depression scale ((SDS))≥ 53. (5) sleeping disorders during the perioperative period. (6) signed inform consent. Exclusion criteria: (1) less than 16 years old; (2) those who had a history of mental disorders (3) Previous diagnosis of insomnia and need to use sedatives. There were 28 males and 15 females, aged 24-58 years, with an average age of (46.8 ± 4.1) years. There were 43 cases in the control group, 26 males and 17 females, aged 16~61 years, with an average age of (47.2 ± 4.5) years. There was no significant difference in the gender, age, marital status, education level, occupation, religious belief, and other general materials among the two groups ($p>0.05$), and the treatment of the stem cells in the two groups was the same.

2.2. Methods

2.2.1. Control Group

The control group received routine nursing care during the perioperative period, including routine psychological care, guidance on the use of hematopoietic stem cell mobilization agents, and health education. Explain to the donors the methods of hematopoietic stem cell mobilization, collection of hematopoietic stem cells, attentions to the collection process, possible adverse reactions and countermeasures, to eliminate the nervousness and fear of donors, and cooperate with the collection. Carefully observe the clinical manifestations and emotional changes during the period of drug use, communicate with the donor and give psychological counseling, and listen to the reasons for the negative emotions of the donor. Answer the doubts of the donor and let them relax.

2.2.2. Observation Group

Observation group; The psychological intervention of mindfulness decompression training was given to the donors. Mindfulness isa method of self-regulation in which individuals consciously maintain their attention onthe physical and mental experience revealed every second, but do not make any judgment on their own emotions, thoughts, illnesses, and other physical and mental phenomena. It mainly includes meditation, Zen meditation, body scanning, mindfulness breathing, mindfulness walking, mindfulness yoga. Its core is to observe and experience the present emotions and feelings in practice, and to maintain a clear awareness [6]. First of all, medical professionals who have been trained professionally explain and teach the donors one by one each day, guiding the donor in a quiet environment, and supine position or sitting position. Relax body, close eyes, do mindful breathing, meditate, practice Zen, feel the ups and downs of the abdomen with breathing, carefully perceive the thoughts, impulses, and emotions, guide the donor to concentration, step up body from the toes to the top of head, and try to understand and feel the areas of concern. If the donor feels that there is a pain in the area, the nursing staff can make them feel that the pain and discomfort will leave the body with the help of the suggestion. After the initial mastery, the patient can practice through the mindfulness decompression training disc, twotimes a day, about 20 minutes each time.

2.3. Outcome Measurements

Observation indicators were used to evaluate two groups of donors on the first day of study (a week before operation) and twoweeks after intervention.

2.3.1. Self-rating Anxiety Scale (SAS) and Self-rating Depression Scale (SDS)

William W. K. Zung compiled the 1.3.1 self self-rating Anxiety Scale (SAS) and the self self-rating Depression Scale (SDS) [7] SAS and SDS scale. SAS and SDS were used to assess the subjective feelings of individuals with anxiety and depression symptoms. It was the basis for measuring the degree of anxiety and depression and its change in treatment. There were 20 items in. SAS and the SDS scale, which mainly assessed the frequency of symptoms of each item in the last week. Using the 4 level scoring method, each item was divided into four grades according to 1~4, and the total score of each item in the 20 items was added to the total score. The total score was multiplied by 1.25 to get the integral part. The standard score was obtained. The higher the standard score, the more serious the anxiety and depression. According to the Chinese norm results, the SAS standard was divided into 50 points, 50-59 of which were mild anxiety, 60-69 was moderate anxiety. 70 points and above were 53 for severe anxiety. SDS, 53-62 for mild depression, 63-72 for moderate depression, 72 for severe depression.

2.3.2. General Condition Questionnaire and Pittsburgh Sleep Quality Index (PSQI)

General situation questionnaire and Pittsburgh sleep quality index (PSQI) scale general situation questionnaire including age, sex, marital status, occupation, educational background, religious belief, and other demographic data

[8]. PSQI consists of 19 items of self-assessment and fiveitems of his evaluation items. They were combined into 7 factors: sleep quality, sleep time, sleep time, sleep efficiency, sleep disorders, hypnotic drugs, and daytime dysfunction. Each factor was scored from 0 to 3, and the highestscorewas 21. The higher the score, the more inferior the sleep quality was. In China, the PSQI>7 was considered as sleep disorder..

2.4. Statistical Analysis

SPSS 22.0 statistical software was used for statistical analysis, continuous variables were expressed by mean ±standard deviation ($\bar{x}$ ±s), two-sample T-test was used for comparison between groups, and paired sample T-test was used for comparison before and after the same group. P < 0.05 is considered to be statistically significant.

3. Results

3.1 Comparison of Donor SAS, SDS Scores Before and after Intervention

There was no significant difference in the scores of SAS and SDS between the two groups before and after intervention. There was no significant difference in the scores of SAS and SDS between the two groups before intervention (p>0.05). After intervention, the scores of the two groups were lower than those before the intervention, and the observation group decreased more significantly than the control group (p<0.05). See table 1.

Table 1. *Comparison of SAS and SDS scores between two groups of donors before and after intervention ($\bar{x}$, + s).*

group	n	SAS score				SDS score			
		Before intervention	Prognosis after intervention	*t**	*P**	Before intervention	Prognosis after intervention	*t**	*P**
Observation group	43	57.15±6.19	35.04±1.97	20.214	0.001	58.69±5.17	39.37±319	17.147	0.001
control group	43	56.95±6.28	46.13±2.86	10.147	0.001	59.26±5.21	48.45±4.36	7.235	0.001
$t^{\#}$		0.336	3.678			0.278	2.249		
$P^{\#}$		0.728	0.001			0.764	0.028		

Remarks: t* P* was compared before and after intervention; $t^{\#}$ $P^{\#}$ was compared between the two groups before intervention and after intervention.

3.2. Comparison of Sleep Quality (PSQI) Scores Before and After Donor Intervention

There was no significant difference in the scores of sleep quality (PSQI) between the two groups before and after intervention. There was no significant difference in the total score of the factors and PSQI scores between the observation group and the control group before intervention (p> 0.05). After the intervention, the total score of PSQI and the scores of all factors in the two groups, except for the hypnotic drugs (p> 0.05), the scores of the two groups were significantly lower than those before the intervention, and the decrease was more obvious in the observation group. The difference was statistically significant (p< 0.05), see table 2.

Table 2. *Comparison of PSQI scores before and after intervention in two groups ($\bar{x}$ + s).*

variable	control group		Observation group		t1/p1	t2/p2	t3/p3	t4/p4
	N=43 before intervention	Prognosis after intervention n=43	Before intervention n=43	Prognosis after intervention n=43				
sleep quality	1.56±0.65	1.46±0.49	1.57±0.56	0.82±0.51	2.901/0.002	5.589/0.001	0.302/0.376	4.413/0.001
Fall asleep time	1.61±0.58	1.52±0.51	1.62±0.73	0.95±0.42	1.828/0.038	3.913/0.005	0.807/0.207	3.571/0.001
Sleeping time	1.69±0.63	1.68±0.47	1.73±0.56	1.01±0.41	1.668/0.047	3.153/0.001	0.182/0.428	1.929/0.027
Sleep efficiency	1.67±0.85	1.61±0.49	1.71±0.63	0.81±0.45	2.065/0.021	3.258/0.001	0.419/0.328	2.461/0.003
Sleep disorders	2.13±0.47	1.65±0.48	2.16±0.12	0.74±0.42	2.095/0.016	4.921/0.001	0.407/0.345	3.148/0.001
sodium amytal	0.17±0.46	0.14±0.35	0.16±0.39	0.08±0.26	-0.46/0.058	-0.659/0.709	1.437/0.805	1.460/0.237
Daytime Dysfunction	1.76±0.57	1.67±0.46	1.74±0.61	0.73±0.46	2.408/0.007	4.278/0.001	0.482/0.307	2.679/0.002
PSQI total score	10.43±2.17	9.57±1.43	10.39±1.97	5.17±1.15	2.828/0.002	12.671/0.001	1.448/0.097	7.467/0.001

Remarks: t_1 /P_1 was compared before and after intervention in the control group. T_2 /P_2 was compared before and after intervention in the observation group. T_3 /P_3 was compared between the two groups before intervention, and the two groups were compared.

4. Discussion

Allogeneic hematopoietic stem cell transplantation is undoubtedly a serious stress event for patients and their relatives, especially for donors who are directly related to their families. When they know that they are going to donate hematopoietic stem cells, on the one hand, they hope that through their donation, they can transplant their loved ones successfully and cure diseases; on the other hand, due to the high medical cost of transplantation, they are afraid that their relatives will fail in transplantation, resulting in two empty money. At the same time, some donors have to shoulder the responsibility of caring for patients before transplantation and have been physically and mentally exhausted during extendedtime care. Moreover, Donor hematopoietic stem cell donation requires subcutaneous injection of granulocyte colony factor to mobilize and stimulate hematopoietic stem

cell growth. During the mobilization period, the growth rate of hematopoietic stem cells is fast. Donors will experience dizziness, head swelling, bone and joint pain, stress, insomnia and so on, resulting in anxiety, depression and uneasiness, which will lead to a decline in sleep quality. Therefore, we should pay attention to the psychological problems of donors and give psychological intervention to relieve their Unconsciousness and avoid the infection of their bad emotions to patients and affect the treatment of patients.

Mindful stress reduction therapy originated from eastern Zen thought, which is an objective and uncritical experience of the perception of the moment by purposefully focusing attention on the present [9]. Mindfulness stress training is mainly based on mindfulness breathing, meditation, and body scanning to adjust patients' poor moods, cultivate their open and receptive attitude, relieve their pressure, and further improve their sleep quality. At present, mindfulness therapy is widely used in the adjuvant therapy of chronic diseases and cancer patients. In this study, mindfulness based stress reduction therapy was applied to hematopoietic stem cell transplant donors to help them eliminate or reduce existing negative emotions by changing their cognitive behavior. Although this method cannot avoid the generation of negative emotions and thinking, in the training process, people's cognitive function can be regulated by gradually strengthening people's will and ability of mindfulness, so as to change patients' cognitive bias and increase positive cognitive reappraisal [10]. This study compared the scores of anxiety, depression, and sleep quality between the two groups before and after intervention. The results showed that there was no significant difference in SAS, SDS and PSQI scores between the two groups before intervention ($P>0.05$). After the intervention, the scores of SAS, SDS and PSQI in the two groups were significantly lower than before the intervention, and the decline was more obvious in the observation group ($P<0.05$), suggesting that the therapy of mindfulness based stress reduction can improve the psychological state of hematopoietic stem cell transplant donors, relieve anxiety, depression and other negative emotions of donors, and improve the quality of sleep. Studies [11-14] pointed out that the application of mindfulness based stress reduction therapy for nursing intervention in patients with nasopharyngeal carcinoma, hematopoietic stem cell transplantation, coronary heart disease and percutaneous coronary intervention can effectively relieve anxiety and depression in patients and improve sleep quality, which is the same as the results of this study.

5. Conclusions

To sum up, mindfulness decompression method can improve the cognitive behavior of hematopoietic stem cell transplant donors, regulate their bad emotions such as anxiety and depression through mindfulness breathing, meditation, guide their open mind, relieve their own mental stress, and thus improve the sleep quality of hematopoietic stem cell transplant donors.

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