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Effects of Acceptance and Commitment Care in the Treatment of Aplastic Anemia Patients with Recombinant Human Thrombopoietin

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ABSTRACT

Background: This study was designed to determine the effects of acceptance and commitment care in the treatment of aplastic anemia (AA) patients with recombinant human thrombopoietin (rhTPO).

Methods: The clinical records of 100 AA patients treated at our hospital from March 2021 to March 2023 were analyzed in the retrospective study. All patients received immunosuppressants and rhTPO. Among them, 46 patients who received routine care from March 2021 to March 2022 were allocated to the control group, and the other 54 patients who received acceptance and commitment care from April 2022 to March 2023 were assigned to the study group. The quality of life (QoL) of the 2 groups was assessed by the MOS 36-Item Short-Form Health Survey (SF-36) before care and after 3 months of care. Blood-related indicators after care were compared in 2 groups.

Results: Before care, no significant inter-group discrepancy was observed in SF-36 scores in all dimensions ($P > .05$); whereas after nursing, the SF-36 scores of both groups increased conspicuously in all dimensions ($P < .001$), especially the study group ($P < .001$). After care, no significant differences were observed in hemoglobin (Hb), platelet count (PLT), and white blood cell count (WBC) between the 2 groups ($P > .05$). A conspicuously lower overall response rate was observed in the control group in contrast to the study group ($P = .044$), and no significant inter-group discrepancy was found in the total incidence of adverse reactions ($P = .506$).

Conclusion: Acceptance and commitment care is conducive to the patients with AA treated by rhTPO, because it substantially improves the QoL of patients, without increasing adverse reactions, so it is worth promoting.

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INTRODUCTION

Aplastic anemia (AA) is a common clinical hematological disease, which is primarily associated with abnormal bone marrow hematopoietic function.[1] Its main clinical manifestations include greatly decreased whole blood cell count, which greatly threatens the life safety of patients and incurs expensive costs, bringing great economic burden to the family and society.[2,3]

Currently, AA is mainly treated with hematopoietic stem cell transplantation, immunosuppression, hematopoietic growth factor, and targeted antibiotics.[4] Thrombopoietin (TPO), an endogenous cytokine stimulating megakaryocyte growth and differentiation, can increase the number of peripheral blood cells *in vivo* and *in vitro* by regulating the proliferation and differentiation of hematopoietic stem cells and megakaryocytes.[5] Recombinant human thrombopoietin (rhTPO) has the same amino acid structure of TPO and complete and stable biological activity of TPO.[6] For patients with AA, it can accelerate platelet recovery and reduce platelet transfusion.[7] However, due to the characteristics of poor condition and rapid progress of AA, effective nursing intervention is needed in addition to treatment, so as to improve the efficacy. Acceptance and commitment care intervention is mainly based on functional contextualism and the theory of relationship framework, with the main purpose of improving patients' psychological state and psychological function, which has achieved certain intervention effects in clinical nursing care of a variety of diseases.[8] The study explored the influences of acceptance and commitment care in treating AA patients with rhTPO, so as to provide a reliable reference for

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follow-up nursing care of AA patients. In a landscape where literature on this specific amalgamation is scarce, our study breaks new ground by forging a path toward a comprehensive treatment paradigm that recognizes and addresses both the physical and psychological dimensions of AA. This innovative approach not only expands the horizons of therapeutic strategies but also highlights the critical importance of a multidisciplinary approach in optimizing patient care and outcomes.

MATERIAL AND METHODS

In this study, 100 clinical patients from the Chongqing University Three Gorges Hospital voluntarily participated in the survey. The study was approved by the Ethics Committee of Chongqing University Three Gorges Hospital (Approval Number: 2021-83). As a retrospective study, patient consent was not obtained due to the retrospective nature of the data collection process. All data were anonymized and handled in accordance with ethical guidelines to maintain patient confidentiality and privacy.

Sample Information

The clinical records of 125 AA patients treated at our hospital from March 2021 to March 2023 were analyzed in the retrospective study.

Inclusion and Exclusion Criteria

Inclusion criteria: Cases who met the relevant diagnostic criteria in the *Guidelines for Diagnosis and Treatment of Aplastic Anemia* and were diagnosed with AA by hematological examination,[9] patients with symptoms such as progressive anemia and hemorrhage; patients without definite active infection and massive hemorrhage; patients between 18 and 65 years old; patients with required clinical records.

Exclusion criteria: Cases who had undergone hematopoietic stem cell transplantation; patients comorbid with other hematological diseases; patients comorbid with malignant tumors; patients who suffered severe disease of the heart, liver, or kidney or other organic diseases; patients who could not cooperate with researchers; patients with psychiatric disorder such as depression, anxiety disorders and sleep disorders: The patient underwent individual assessment by a qualified psychiatrist to determine the presence of psychiatric disorders, involving detailed interviews, medical history collection, and psychological evaluations. Diagnosis was based on DSM-5, where symptoms and presentations were evaluated to ascertain adherence to specific psychiatric disorder diagnostic criteria. Finally, 2 patients were excluded for depression; 2 patients were excluded for anxiety disorders and 1 patient was excluded for sleep disorder; patients who used psychotropic drugs; patients with drug contraindications;

Sample Screening

Following the outlined criteria, 125 patients underwent screening, with 100 patients meeting the inclusion criteria. All patients were treated with immunosuppressant and rhTPO. Among them, 46 patients who received routine care from March 2021 to March 2022 were allocated to the control group, and the other 54 patients who received acceptance and commitment care from April 2022 to March 2023 were assigned to the study group.

Our hospital introduced acceptance and commitment care to replace routine care from April 2022 for the potential benefits of improving treatment outcomes, providing personalized care, and offering comprehensive support to enhance overall patient recovery and elevating healthcare quality.

Therapeutic Regimen

All patients were treated with immunosuppressants, including sirolimus, cyclosporine, and 11-acid testosterone after admission. At 15 days after the immunotherapy program, each patient was given a subcutaneous injection of 15 000 U rhTPO, once every other day, for 14 times in total. Patients in both groups were followed up for 3 months after treatment.

Nursing Scheme

The control group was given routine nursing, including nutrition guidance, rehabilitation and lifestyle guidance, explanation of matters needing attention, and disease observation.

The study group was given acceptance and commitment care based on routine nursing. Specifically: (1) Establishing a relationship: A nursing group was set up, and the responsible nurse was required to interview each patient before discharge to evaluate the patient's psychological resilience and post-traumatic growth and explain the theory and principles of acceptance and commitment therapy to the patient in detail. (2) Acceptance: The nursing staff was arranged to encourage

MAIN POINTS

- Effectiveness of acceptance and commitment care: Acceptance and commitment care are conducive to the efficacy of rhTPO in treating AA patients.
- Improved QoL: Patients receiving acceptance and commitment care demonstrated substantial improvements in their quality of life, as assessed by the SF-36 after 3 months of care.
- Overall response rate: The study group displayed a conspicuously higher overall response rate in contrast to the control group, indicating the effectiveness of acceptance and commitment care in AA treatment.
- Safety and adverse reactions: Acceptance and commitment care did not lead to an increase in adverse reactions, making it a valuable approach for improving patient outcomes in AA treatment.

the patient to express the symptoms and feelings and their impact on life and family after treatment, and also encourage the patient to observe and experience these negative emotions as objects and actively accept reality. (3) Cognitive defusion: The nursing staff was arranged to guide the patient to observe the patient's own mental activities objectively and effectively separate self-consciousness, intention, and memory, help the patient distinguish between reality and ideas, and tell the patient that ideas have not happened and the patient should take action on the basis of reality to avoid the adverse effects of negative emotions. (4) Experiencing the moment: Patients usually worry about the treatment effect after treatment. Therefore, the nursing staff was arranged to encourage the patient to extricate himself/herself from the negative emotions after treatment, experience the happiness of life, and cherish and enjoy the moment of getting along with family and friends. (5) Clarifying values: Through positive guidance, the nursing staff let the patient think and helped the patient adjust his/her mentality and adopt an optimistic and positive attitude towards the future so that the patient could return and adapt to society as soon as possible. (6) Committed action: The nursing staff formulated targeted health education program and rehabilitation training plan according to the rehabilitation situation and needs of the patient, covering the occurrence and development of hematological diseases, prognosis, the importance of treatment, and nursing compliance. The staff suggested that patients should first achieve simple short-term goals and then achieve rehabilitation training plan one by one from simple to complex, from low-level to high-level based on real actions and the commitment of nurses.

The care cycle of both groups was 3 months.

Outcome Measures

(1) Quality of life (QoL): Before care and after 3 months of care, the MOS 36-Item Short-Form Health Survey (SF-36) was used to analyze and compare the QoL of the 2 groups,[10] including 36 items in 10 aspects in 8 dimensions, namely social functioning, mental health, role-emotional, general health, vitality, bodily pain, physical functioning as well as role-physical. The highest score of each dimension was 100 points, and the lowest score was 0. A higher score suggests higher QoL in this dimension. (2) Clinical efficacy: The efficacy of the 2 groups at 3 months after treatment was evaluated according to the following criteria:[11] Complete remission (CR): All indexes of blood routine results of the patient returned to normal, and the patient did not depend on blood component transfusion and had hemoglobin (Hb) ≥ 100 g/L; partial remission (PR): The indexes of blood routine results of the patient were alleviated and the patient did not receive blood component transfusion and had hemoglobin (Hb) >80 g/L but <100 g/L; non-remission (NR): The indexes of blood routine results were not alleviated compared with those before treatment, and the patient still require transfusion of blood products and had Hb ≤ 80 g/mL. Overall remission rate (ORR) = (the number of cases with CR + that of cases with PR)/the sum of cases × 100%. (4) Complications: The occurrence of complications during treatment and the 3 months of nursing were recorded, including skin infection, oral infection, and subcutaneous tissue hemorrhage. (5) Blood-related indicators: After 3 months of treatment, fasting cubital venous blood samples were collected from both groups and analyzed using an automated hematology analyzer to measure hemoglobin (Hb), platelet count (PLT), and white blood cell count (WBC).

Statistical Analyses

This study used SPSS 20.0 for statistical processing of the collected data and adopted GraphPad 8 software package for data visualization. The measurement data were normally distributed and presented by mean ± SD, and their inter-group comparison and intra-group comparison were performed via the independent-samples T test or paired t test. The counting data were described by n (%) and analyzed using the Chi-square test or Fisher's exact test. $P < .05$ suggests a significant difference.

RESULTS

Baseline Data

The control and study groups did not differ notably regarding baseline data including age, body mass index (BMI), course of disease, sex, and history of smoking ($P > .05$, Table 1).

Comparison of QoL

Before nursing, the 2 groups were not greatly different in QoL scores in eight dimensions, whereas after nursing, the QoL scores of both groups in all dimensions increased greatly ($P < .001$), especially the study group ($P < .001$, Figure 1).

Comparison of Efficacy

According to the follow-up results within 3 months after treatment, the control group presented a notably lower overall response rate in contrast to the study one ($P = .044$, Table 2).

Comparison of Adverse Reactions

Within treatment and 3 months of nursing, the control group and study group were not greatly different regarding the total incidence of adverse reactions ($P = .506$, Table 3).

Table 1. Baseline Data

Factors		Study Group (n = 54)	Control Group (n = 46)	*P* Value
Age				.663
	≥45 years old	20 (37.04)	19 (41.30)	
	< 45 years old	34 (62.96)	27 (58.70)	
Gender				.308
	Male	25 (46.30)	26 (56.52)	
	Female	29 (53.70)	20 (43.48)	
BMI				.318
	≥23 kg/m^2	16 (29.63)	18 (39.13)	
	<23 kg/m^2	38 (70.37)	28 (60.87)	
Course of disease				.509
	≥4 years	10 (18.52)	11 (23.91)	
	<4 years	44 (81.48)	35 (76.09)	
History of smoking				.699
	Yes	22 (40.74)	17 (36.96)	
	No	32 (59.26)	29 (63.04)	
History of alcoholism				.498
	Yes	11 (20.37)	12 (26.09)	
	No	43 (79.63)	34 (73.91)	
Place of residence				.615
	Rural areas	35 (64.81)	32 (69.57)	
	Urban areas	19 (35.19)	14 (30.43)	

Comparison of Blood-Related Indicators

An analysis comparing the blood-related indicators of the 2 groups revealed no significant differences in Hb, PLT, and WBC after 3 months of care ($P > .05$, Table 4).

DISCUSSION

AA is a hematological disease, mainly manifested as infection, bleeding and anemia, with characteristics of long course and easy recurrence, and patients with it are prone to negative emotions during treatment, so it is difficult to treat clinically.[12,13] Currently, the main treatment of AA includes hematopoietic stem cell transplantation and immunosuppression therapy. Immunosuppressant is a common method to treat AA, which can inhibit the abnormal activity of immune system and promote the recovery of hematopoietic function.[14-16] RhTPO is a full-length glycosylated thrombopoietin. The drug mainly relies on gene recombination technology, which can promote the proliferation and division of bone marrow megakaryocytes and increase the release of platelets, thus increasing the number of platelets.[17] However, due to the long course and treatment cycle of AA, patients with it are prone to negative emotions during treatment, which compromises the clinical efficacy, so attention should be paid to the application of reasonable nursing care.[18] This study explored the effect of acceptance and commitment care in the treatment of AA patients with rhTPO.

Acceptance and commitment care intervention is a new behavioral nursing method mainly based on patients' inner emotion. Under this mode, the nursing staff guide and assist the patients to accept the disease and regulate the cognitive ability so as to improve their psychological resilience, help them recover from the disease trauma and improve their QoL and prognosis.[19-21] In this study, the study group given acceptance and commitment care got notably higher SF-36 scores than the control group in all dimensions, suggesting that acceptance and commitment care could improve the QoL of patients after treatment compared with routine care. The reason may be as follows: acceptance and commitment care can assess patients' psychological acceptance in the process of carrying out nursing measures, and help patients form cognitive reconstruction in a relaxed state, which can substantially improve patients' sense of self-control and psychological and social adaptability. In addition, under such a mode, a behavior change plan consistent with patients' values is chosen in the process of carrying out nursing measures, which can improve the patients' healthy behavior and social relations.[22] The lack of significant differences in Hb, PLT, and WBC between the 2 groups of patients after treatment implies that the effects of the 2 nursing care approaches on these blood indicators are similar. In addition, according to the follow-up results 3 months after treatment, a conspicuously lower overall response rate was found in the control group in contrast to the study group, which indicated that acceptance and commitment care may be conducive to patients with AA treated by rhTPO. The study also explored adverse reactions, and found no significant inter-group difference in the total incidence of them. The absence of a significant inter-group difference in the total incidence of adverse reactions may be attributed to various factors. These include the timing and focus of the acceptance and commitment care, primarily post-discharge, and potentially influencing quality of life more than adverse reactions directly. The study's sample size, treatment consistency with all patients receiving immunosuppressants and rhTPO, adherence levels to care protocols, the specific nature of adverse reactions monitored, and the baseline health status of patients could have also played roles in the observed outcomes. These factors collectively suggest that the lack of significant differences in adverse reactions between the groups could be influenced by the study's design and the nature of the interventions provided. Further research

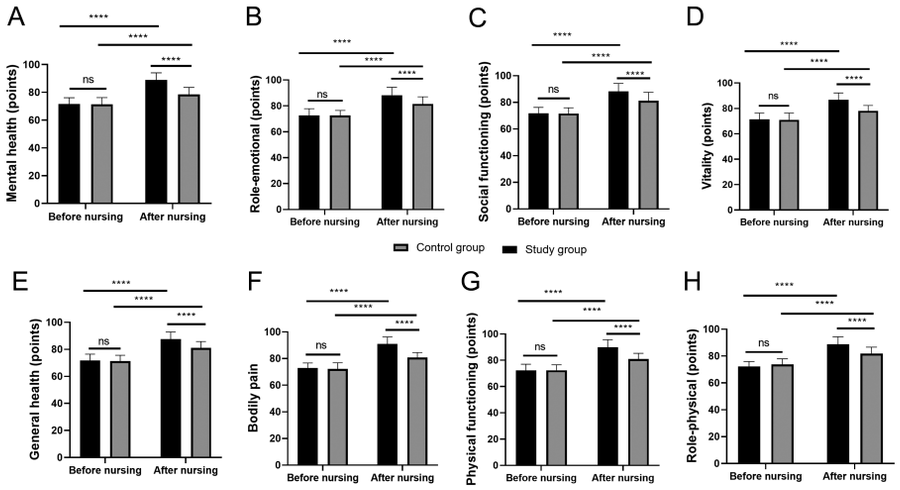

Figure 1. Comparison of quality of life between 2 groups before and after nursing. (A) Comparison of mental health scores between the 2 groups before and after nursing; (B) Comparison of social functioning scores between the 2 groups before and after nursing; (C) Comparison of role-emotional scores between the 2 groups before and after nursing; (D) Comparison of vitality scores between the 2 groups before and after nursing; (E) Comparison of general health scores between the 2 groups before and after nursing; (F) Comparison of bodily pain scores between the 2 groups before and after nursing; (G) Comparison of physical functioning scores between the 2 groups before and after nursing; (H) Comparison of role-physical scores between the 2 groups before and after nursing. Notes: ns$P > .05$; ****$P < .001$

Table 2. Comparison of Efficacy Between 2 Groups [n (%)]

Group	CR	PR	NR	ORR
Study group (n = 54)	5 (9.26)	29 (53.70)	20 (37.04)	34 (62.96)
Control group (n = 46)	1 (2.17)	18 (39.13)	27 (58.70)	19 (41.30)
P-value	.214	.164	.044	.044

and considerations in these areas could offer deeper insights into the relationship between acceptance and commitment care and adverse reactions in aplastic anemia patients undergoing treatment with recombinant human thrombopoietin.

This study still has some limitations. Firstly, the limited sample size may result in some deviation in the conclusion. Additionally, this study did not follow-up the patients' long-term prognosis, so the impact on the long-term prognosis requires further investigation. Moreover, we would like to acknowledge another limitation of this study, as Cronbach's alpha values were not explicitly provided for the assessment of scale reliability. Due to constraints in expertise and resources, independent analysis to obtain

Table 3. Incidence of Adverse Reactions [n (%)]

Group	Skin Infection	Oral Infection	Subcutaneous Tissue Hemorrhage	Total Adverse Reaction
Study group (n = 54)	1 (1.85)	1 (1.85)	2 (3.70)	4 (7.40)
Control group (n = 46)	1 (2.17)	2 (4.35)	3 (6.52)	6 (13.04)
P-value	>.999	.593	.659	.506

Table 4. Comparison of Blood-Related Indicators

	Hb (g/L)	PLT ($\times 10^9$/L)	WBC ($\times 10^9$/L)
Study group (n = 54)	90.13 ± 28.45	50.66 ± 22.04	4.21 ± 1.94
Control group (n = 46)	92.24 ± 25.63	51.97 ± 19.13	4.08 ± 1.42
t	0.811	1.794	0.620
P-value	.419	.076	.537

Cronbach's alpha values was not conducted. Future studies may benefit from including this measure for a more comprehensive evaluation of scale reliability. Finally, the lack of a placebo care control group necessitates a cautious interpretation of the outcomes to fully appreciate the potential confounding effects of enhanced care delivery on nursing satisfaction measures.

CONCLUSION

In conclusion, acceptance and commitment care is conducive to the patients with AA treated by rhTPO, because it substantially improves the QoL of patients, without increasing adverse reactions, so it is worth promoting.

Ethics Committee Approval: This study was approved by the Ethic Committee of Chongqing University Three Gorges Hospital (Approval Number: 2021-83, Date:April 23, 2024).

Informed Consent: Patients were not required to give informed consent to the study because the analysis used anonymous clinical data that were obtained after each patient agreed to treatment by written consent.

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Declaration of Interests: The authors have no conflict of interest to declare.

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Supplementary Table 1. Quality of Life of the 2 Groups Before and After Nursing

	Mental health	Role-emotional	Social functioning	Vitality	General health	Bodily pain	Physical functioning	Role-physical
Before treatment								
Control group (n=46)	71.30±4.93	72.62±3.94	71.64±4.31	71.00±5.38	71.41±4.24	72.23±4.62	72.39±4.14	73.76±4.19
Study group (n=54)	71.56±4.53	72.68±5.19	71.81±4.45	71.45 ±4.89	71.74±4.70	73.06±3.62	72.19±4.74	72.21±3.78
P	0.786	0.949	0.846	0.667	0.715	0.322	0.822	0.056
After treatment								
Control group (n=46)	78.46±5.09	81.57±5.51	81.27±6.36	78.07±4.34	81.11±4.68	80.77±3.76	80.95±4.38	81.82±4.80
Study group (n=54)	88.92±5.11	88.28±6.10	88.23±5.99	86.91±5.33	87.62±5.29	91.03±5.24	89.99±5.61	88.80±5.56
P	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001