Journal of Clinical and Nursing Research

Research Article

Evaluation of the Effect of Shenmai Injection on Chemotherapy Efficacy and Side Effects of Acute Leukemia

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Abstract: ***Objective.*** To study the effect of Shenmai injection on the efficacy and side effects of chemotherapy in acute leukemia. ***Methods.*** Sixty-two patients with acute leukemia admitted to the hospital between February 2018 and June 2019 were enrolled in this study. All patients were divided into observation and control groups according to different treatment methods in chemotherapy. The control group was treated with chemotherapy alone. The observation group was treated Shenmai injection combined with chemotherapy. The treatment effect of the two groups was compared, and the incidence of bone marrow blood and side effects before and after treatment were compared. ***Results.*** The therapeutic effect of the observation group was 93.55% which was much higher than that of the control group of 74.19%, $P<0.05$. The bone marrow blood levels of WBC, PLT and Hb in the observation group before and after treatment were 23.97±3.05, 6.76±1.27, 69.01±8.15, 66.96±9.46, 91.07±8.15, 89.35±7.46, respectively, compared with the control group. The difference in the situation after treatment was found to be significant. The incidence of toxic side effects such as nausea and vomiting, impaired liver function and renal dysfunction in the observation group was 9.68%, which was lower than that of the control group (32.26%, $P<0.05$). ***Conclusion.*** Shemai injection has significant effects on the efficacy and side effects of chemotherapy in acute leukemia and effectively improves the effect of chemotherapy.

Keywords: Shemai injection, Acute leukemia, Chemotherapy efficacy, Side effects

Publication date: November, 2019

Publication online: 30 November 2019

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1 Introduction

At present, acute leukemia is generally treated with anti-tumor drugs, and it is also a major treatment method which belongs to chemotherapy[1]. Chemotherapy can effectively reduce and eliminate leukemia cell populations in the human body, thereby reducing clinical symptoms and providing a solid foundation for the recovery of hematopoietic function in patients[2]. However, chemotherapy treatment will bring more toxic and side effects to patients with acute leukemia, and it will cause significant damage to the human body, and even threaten the life of the patient. If it cannot be treated in time, it will easily lead to further injury to the patient, and it is not conducive to the patient's body[3]. This study focused on the effect of Shenmai injection on the efficacy and side effects of chemotherapy in acute leukemia. The details are as follows.

2 Information and methods

2.1 Clinical basic data

In order to conduct this study, 62 patients with acute leukemia were selected from February 2018 to June 2019. They were divided into observation and control

groups according to different treatment methods. There are 31 patients in each group. The number of males and females in the observation group was 17 and 14, respectively, and the age ranged from 14 to 68 years old with an average of (40.16±1.06) years. Among them, the number of patients with acute non-lymphocytic leukemia was 22 while the number of patients with acute lymphoblastic leukemia was 9 with a course of disease ranging from 1 to 54 months, and an average duration of disease was (22.42±1.21) months. Meanwhile, the number of males and females in the control group was 16 and 15, respectively, and the age ranged from 15 to 69 years old with an average of (40.212±1.08) years. Among them, the number of patients with acute non-lymphocytic leukemia was 21 while the number of patients with acute lymphoblastic leukemia was 10 with a course of disease ranging from 2 to 54 months, and an average duration of disease was (22.43±1.26) months. The patient's comparison in the above data was not statistically significant.

2.2 Methods

Patients in the control group were treated with conventional chemotherapy. The patients were first given intravenously for once a week and treated with 40 mg of prednisone for twice a day with 20 mg each time. At the same time, 1 mg/kg daunorubicin should be used for intravenous infusion once a week. On this basis, the observation group patients were treated with Shenmai injection. The chemotherapy process was the same as that of the control group with an addition of 40 ml of Shenmai injection combined with 500 ml of 5% glucose intravenous infusion for once a day. All patients were treated for eight weeks.

2.3 Observation indicators

The incidence of toxic side effects such as bone marrow blood, nausea and vomiting, impaired liver function and renal dysfunction before and after treatment, WBC, PLT, Hb and other treatments effects were observed and analyzed in both groups.

2.4 Statistical analysis

The relevant data were tested by SPSS 17.0, and the X^2 value of the treatment effect as well as the incidence of side effects was tested. At the same time, the T value of bone marrow blood was calculated, and the value was statistically significant when $P<0.05$.

3 Results

3.1 Comparison of treatment effects

Treatment effects in both groups of patients were compared, and it was found that the observation group was higher than the control group, as shown in Table 1.

Table 1. Comparison of intervention effects between the two groups

Groups	Significantly effective	Effective	Not effective	Total efficacy
Observation group (n = 31)	18 (58.06%)	11 (35.48%)	2 (6.45%)	29 (93.55%)
Control group (n = 31)	14 (45.16%)	9 (29.03%)	8 (25.81%)	23 (74.19%)
X^2				4.2923
P				0.0382

3.2 Comparison of bone marrow blood before and after treatment

The results of bone marrow blood in the observation group before and after treatment in WBC, PLT and Hb were as follows. See Table 2 for details.

3.3 Comparison of the incidence of side effects

Table 2. Comparison of bone marrow blood before and after treatment in both groups

Groups	WBC		PLT		Hb	
	Before	After	Before	After	Before	After
Observation group (n=31)	23.97±3.05	6.76±1.27	69.01±8.15	66.96±9.46	91.07±8.15	89.35±7.46
Control group (n=31)	24.32±3.66	2.68 ± 1.09	68.93 ± 7.05	49.15 ± 6.72	90.32 ± 8.17	70.35 ± 4.24
T	0.4090	13.5732	0.0413	8.5455	0.3618	12.32847
P	*P*>0.05	*P*<0.05	*P*>0.05	*P*<0.05	*P*>0.05	*P*<0.05

The incidence of toxic side effects such as nausea and vomiting, impaired liver function and renal dysfunction was lower in the observation group than in the control group. See Table 3 for details.

Table 3. Comparison of the incidence of side effects

Groups	Nausea and vomiting	Impaired liver function	Renal dysfunction	Total incidence
Observation group (n = 31)	1	1	1	3 (9.68%)
Control group (n = 31)	4	3	3	10 (32.26%)
X^2				4.7692
P				0.0289

4 Discussion

The cause of leukemia is mainly due to the occurrence of stages of apoptosis, blocked differentiation, malignant proliferation in the process of hematopoietic stem cells differentiation, which leads to a hematopoietic malignant tumor disease. In general, acute leukemia occurs mainly in the early stage of leukemia, and chemotherapy is usually used for treatment[4]. Such a treatment can kill leukemia cells in the human body in a short period of time, and the leukemia cells in the patient can be effectively eliminated in remission induction therapy, and finally a complete remission can be achieved. The sign of complete remission is mainly based on the level of leukemia cells in the body, which is dropped from 1011~1012 to 108~109[5]. Thus far, the acute leukemia chemotherapy treatment that often used in clinical practice mainly includes daunorubicin, doxorubicin, cytarabine, and L-asparaginase. However, conventional chemotherapy can cause particular trauma and impact on the patient's body. It has been proved by clinical experiments that liver and kidney dysfunction, arrhythmia and blood abnormalities are prone to occur during chemotherapy, although it has beneficial effect on leukemia treatment. It is more likely to cause other complications in the patient and is life-threatening if not handled properly. In this study, Shenmai injection was added to the treatment based on conventional chemotherapy, which not only reduced the side effects of chemotherapy, but also improved the clinical treatment effect and effectively improved the hematopoietic function of bone marrow.

According to Chinese medical research, acute leukemia is an accumulative disorder of deficiency and blood syndrome. The main mechanism that triggers the disease is the lack of righteousness, sinister invasion and warm poison in the human body which developed from the surface and gradually invaded the internal organs, eventually leading to impaired bone marrow, real imaginary evil, meridians by the evil into the organs as well as insufficient of qi and blood[6]. In addition, Chinese medicine research also shows that the relationship between the occurrence of acute leukemia and the process of disease development is very close. If the evil in the body is gradually discharged and the righteousness gradually recovers, it means that the disease can be cured. If the evil in the human body is always retained, and the righteousness cannot be compensated, it will speed up the disease development and even lead to the death of the patient. The use of chemotherapy alone can effectively reduce and eliminate leukemia cells in the human body, but it will also cause great harm to the human body especially causing the righteousness defect, which may lead to qi and yin deficiency and others. Therefore, in the treatment of acute leukemia, the critical point is to replenish qi and yin in order to improve the clinical effect and the prognosis of patients as well as to reduce the incidence of toxic side effects[7]. The Shenmai injection used in this study is mainly composed of Ophiopogon japonicus and ginseng. Both drugs have the functions of nourishing vitality, pulse-restoring to benefit yin, benefiting qi to promote fluid production and so on. According to relevant research, ginseng saponins contained in ginseng can effectively promote the proliferation of bone marrow cells, production and reproduction of cells, strengthen the growth of immunoglobulins, and also improve the function of reticuloendothelial cells, which is beneficial to eliminate leukemia cells in the body and strengthen lymphocyte transformation[8].

In this study, the therapeutic effect of the observation group was 93.55%, which was much higher than that of the control group of 74.19%, $P<0.05$. The bone marrow blood levels of WBC, PLT and Hb in the observation group were 23.97±3.05, 6.76±1.27, 69.01±8.15, 66.96±9.46, 91.07±8.15, 89.35±7.46 compared with the control group (24.32±3.66, 2.68±1.09, 68.93±7.05, 49.15±6.72, 90.32±8.17, 70.35±4.24), respectively. The difference after treatment was found to be significant.

The incidence of toxic side effects such as nausea and vomiting, impaired liver function and renal dysfunction in the observation group was 9.68%, which was lower than that of the control group (32.26%, $P<0.05$).

In a nutshell, Shenmai injection has a significant effect on the efficacy and side effects of chemotherapy in acute leukemia, which can effectively alleviate the side effects caused by chemotherapy and promote the improvement of cell regeneration ability to greatly reduce the growth and reproduction of leukemia cells *in vivo*. It is worth for further promotion in the clinic application.

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