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Comparison of the Effects of L-asparaginase and Pegaspargase in the Treatment of Adult Acute Lymphoblastic Leukemia

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Abstract: *Objective:* To compare the effect of L-asparaginase and pegaspargase in the treatment of adult acute lymphoblastic leukemia. *Methods:* In this study, 96 patients who received treatment at the Shaanxi Provincial People's Hospital from April 2019 to April 2021 were selected. The control group received L-asparaginase treatment, and the observation group received pegaspargase treatment. The curative effect and adverse reaction rate were compared between the two groups. *Results:* Comparing the experimental statistical results of the observation and the control groups, it can be concluded that the effect of the former group is better than that of the latter group in terms of clinical curative effect and statistics of adverse reactions. *Conclusion:* In the treatment of adult acute lymphoblastic leukemia, the application of pegaspargase therapy has a significantly better clinical effect and is worthy of further promotion.

Keywords: Pegaspargase; L-asparaginase; Adult; Acute lymphoblastic leukemia

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1. Introduction

Acute lymphoblastic leukemia, in the classification of clinical diseases, is a kind of acute leukemia, and the cause of the disease is mostly caused by the excessive involvement of lymphocytes in the patient's body [1]. After clinical examination, it was found that in the process of acute lymphoblastic leukemia patients receiving treatment in the hospital, the most frequently used treatment plan is the basic chemotherapy diagnosis and treatment plan of L-asparaginase, and this plan also has a certain clinical value. The efficacy of anti-tumor spread [2]. However, with the in-depth analysis of lymphocytic leukemia in the medical field, it has been found that after using the above-mentioned drugs, patients often have a series of adverse reactions such as gastrointestinal tract and blood coagulation abnormalities during clinical treatment, and even have a large number of adverse reactions, and increase the risk of bleeding to a large extent, causing the patient's condition to worsen again during treatment [3]. In the face of this situation, it is imminent to make an in-depth exploration of actively applying drugs with higher drug safety in clinical practice in the treatment of lymphocytic leukemia in adults [4]. Therefore, in this study, after adjusting the treatment plan for the patients, it was decided to adopt the treatment plan of pegaspargase for the upgraded diagnosis and treatment of clinical treatment. The specific

experimental research contents are as follows.

2. Materials and methods

2.1. General information

In this study, 96 patients who received treatment at the Shaanxi Provincial People's Hospital from April 2019 to April 2021 were selected for research. The specific grouping information is as follows:

(1) Observation group: 22 males and 26 females respectively, with an average age of (35.09 ± 0.07) years old;

(2) Control group: 23 males and 25 females, with an average age of (35.16 ± 0.01) years old;

Both groups of patients and their families gave informed consent to participate in the study, and the study was reviewed by the Medical Ethics Committee.

2.2. Methods

In the basic treatment plan of the two groups, the drug vincristine was used for treatment by intravenous injection, the dosage was 1.4 mg/m², and the frequency of medication was once a week. The patients participating in the experimental study needed to experience a total of 4 treatments. It is also necessary to use 40 mg/m² daunorubicin for the patient through intravenous injection. In terms of oral medication, the two groups of patients participating in the experiment were treated with prednisone tablets, 12 tablets each time, once a day, and the treatment cycle was 21 days before stopping the drug.

Under the conditions of the above-mentioned basic treatment plan, the drug regimens of the control group and the observation group are as follows:

(1) Control group: According to the standard of 6000 U/m², the patient was injected with L-asparaginase by intravenous infusion during the treatment. The interval of administration was once a day, and the continuous treatment cycle was 8 times.

(2) Observation group: In the treatment period, 2500 U/m² was used as the interval period, and pegaspargase was used for treatment by intravenous infusion, once every other week. A total of 2 treatments were continued.

2.3. Observation indicators

The observation indicators in this study were:

(1) Compared the treatment effects of the two groups. The treatment effects were categorized as follows: (i) markedly effective – after clinical treatment, the patient's sense of fatigue decreased, blood loss decreased significantly, appetite increased, infection and other symptoms disappeared, and other indicators of the body began to return to normal; (ii) general – the symptoms of clinical treatment have improved, and all blood cell indicators have begun to develop normally; and (iii) not effective – the patient's condition has not improved significantly, but after treatment, recurrent attacks or even aggravated symptoms appear.

(2) Comparison of adverse reactions between the two groups of patients after treatment. Comparative indicators include infection, coagulation dysfunction, liver function damage, bleeding, and gastrointestinal reactions.

2.4. Statistical processing

SPSS25.0 is used to calculate data, "%" represents count data, and the x^2 test was used, "mean ± standard

deviation (SD)" represented the measurement data, and the *t*-test was used, and $P < 0.05$ represented the data difference.

3. Results

3.1. Comparing the total effective rate of the two groups of treatments

Comparing the curative effects of the observation group and the control group, it can be seen that the effect of the former is significantly better than that of the latter ($P < 0.05$), see **Table 1**.

Table 1. Comparison of total effective rate between the two groups [*n* (%)]

Group	Number of cases	Markedly effective	General	Not effective	Total efficacy
Observation group	48	35 (72)	10 (20.83)	3 (6.25)	45 (93.75)
Control group	48	27 (56.25)	11 (22.92)	10 (20.83)	38 (79.17)
x^2		2.9146	0.0610	4.3596	4.3596
P		0.0878	0.8050	0.0368	0.0368

3.2. Comparison of the incidence of adverse reactions between the two groups

Comparing the statistical results of the observation group and the control group, it can be seen that the incidence of adverse reactions in the former was significantly lower as compared to the latter ($P < 0.05$), see **Table 2**.

Table 2. Comparison of the incidence of adverse reactions between the two groups [*n* (%)]

Group	Number of cases	Coagulation disorders	Liver damage	Bleeding	Infection	Gastrointestinal reaction	Total
Observation group	48	6 (12.50)	2 (4.17)	1 (2.08)	1 (2.08)	1 (2.08)	11 (22.92)
Control group	48	10 (20.83)	4 (8.33)	3 (6.25)	2 (4.17)	2 (4.17)	21 (43.75)
x^2		1.2000	0.7111	1.0435	0.3441	0.3441	4.6875
P		0.2733	0.3991	0.3070	0.5575	0.5575	0.0304

4. Discussion

Analyzing the symptoms of adult acute lymphoblastic leukemia, it can be found that it has the characteristics of rapid disease progression and acute onset. Current statistics include genetics, viral infection, gene mutation, or prolonged exposure to chemicals. With the deepening of medical technology, the application of asparagine has been preliminarily proven clinically, which can exert a certain effect on the treatment of adult acute lymphoblastic leukemia [5-7]. After this experimental study, it can also be found that after the application of L-asparaginase, it can decompose the corresponding enzyme in the blood of the patient, so that the cancer cells are always in a poor state of division, and achieve the effect of anti-tumor treatment. However, its shortcoming is that the half-life of the drug is too short, and the frequency of the drug is required to be high, which leads to the formation of drug antibodies in patients and increases the side effects of the drug, which affects the final therapeutic effect [8].

Compared with the treatment plan of L-asparaginase, after the treatment of adult acute lymphoblastic leukemia with pegaspargase, asparagine in the patient's body can be consumed in a short period, and the essential substance for leukemia cell division has been maintained. After inhibiting the growth of this substance, it will not affect the growth of other normal cells in the patient's body, so that the anti-tumor effect of the drug

can be exerted [9]. Combined with the previous experimental research results, it is also shown that the curative effect and incidence of adverse reactions of asparaginase in the treatment of adult acute lymphoblastic leukemia are higher than those of L-asparaginase, which fully demonstrates that asparaginase has higher clinical therapeutic value. It can be further developed and applied in subsequent clinical diagnosis and treatment.

Disclosure statement

The authors declare no conflicts of interest.

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