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Research Article

Therapeutic Effects of Kanglaite Injection Combined with Chemotherapy on Advanced Non-small-cell Lung Cancer

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Abstract: The objective of this study was to study the therapeutic effect of Kanglaite injection combined with chemotherapy in the treatment of late-stage non-small-cell lung cancer (NSCLC) and also to observe the effect of the combination treatment on immune function. 92 patients with advanced stage of NSCLC who admitted to First Hospital of Zibo city hospital from May 2017 to October 2018 were randomly divided into experimentagroup and control group, with 46 cases, respectively. The control group was treated with chemotherapy only while the experimental group was treated with Kanglaite injection combined with chemotherapy which was the basic treatment for patients, and the total treatment effective rate, adverse reaction rate, and immune index of the treatments on two groups were compared. The total treatment effective rate of the experimental group was 80.43%, which was significantly higher than that of the control group, which was 63.04%. The incidence of adverse reactions in the experimental group was 36.96%, which was lower than that of the control group (78.26%). The immune indexes of the experimental group (CD3+, CD4+, IgG, and IgA) were better than that of the control group, respectively. The differences between the two groups were statistically significant ($P < 0.05$). During the chemotherapy of late-stage or advanced NSCLC, the addition use of Kanglaite injection has a significant effect on improving tumor control and reducing the side effects of chemotherapy, and helps to improve the immune function of patients; thus, it is worth promoting.

Keywords: *Kanglaite injection; chemotherapy; advanced non-small-cell lung cancer; adverse reactions; immune function*

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0 Introduction

Lung cancer is one of the common malignant tumors. Its incidence is related to smoking, environmental pollution, chronic inflammation of the lungs, etc. The rate of morbidity and mortality in lung cancer is increasing and leads in the first place among the malignant tumors, and it is a serious threat to human health and life safety[1]. Non-small-cell lung cancer (NSCLC) patients have a high proportion in lung cancer; it can reach about 80%, which including adenocarcinoma, squamous cell lung carcinoma, and large cell carcinoma. These types of cancer cells in patients have slower cell growth and division, and late metastasis. Once the tumor developed into advanced stage, the disease condition is only and mainly controlled by chemotherapy and thus to prolong the survival period. Chemotherapy also affects the normal cells and tissues while it is destroying the cancer cells and gradually causing toxic and adverse side effects in patients[2]. To find a more effective treatment plan, our department had treated a group of patients with Kanglaite injection while they were undergoing chemotherapy, and it showed a more satisfying result. It is reported as follows.

1 Baseline data and methodology

1.1 Baseline data

A total of 92 patients with advanced NSCLC who underwent chemotherapy in our department in First

Hospital from May 2017 to October 2018 were included in the study group. Using the random number table method, the patients were divided into two groups which were the experimental group and control group with 46 patients in each group, respectively. The male and female patients in the experimental group were 26 cases and 20 cases, respectively; the age of patients ranged from 50 to 75 years old, with a median value of 64.5 ± 5.1 years old; pathological types were 23 cases of squamous cell carcinoma of the lung, 19 cases of lung adenocarcinoma, and four cases of alveolar carcinoma; TNM staging showed 18 cases in Stage IIIa, 19 cases in Stage IIIb, and nine cases in Stage IV. There were 27 males and 19 females in the control group with the age ranged from 48 to 76 years, with a median of 64.1 ± 5.5 years old; pathological type was 22 cases of squamous cell carcinoma of the lung, 21 cases of lung adenocarcinoma, and three cases of alveolar carcinoma; TNM staging showed 17 cases in Stage IIIa, 21 cases in Stage IIIb, and eight cases in Stage IV. There were no differences between the two groups with respect to the data above, $P > 0.05$, no statistical significance.

1.1.1 Inclusion criteria

Patients who diagnosed as advanced cancer tumors using X-ray, bronchoscopy, cytological examinations, etc., and predicted with survival lifetime >6 months, KPS scores of >60 points, and no surgical indications.

1.1.2 Exclusion criteria

Patients with severe cardiopulmonary hepatorenal dysfunction and chemotherapy intolerance, and those patients who were not giving cooperation in the studies were excluded too.

The enrolled patients had informed consent for the study and volunteered themselves to participate in the study.

1.2 Methodology

1.2.1 Control group

The patients were only treated with cisplatin and vinorelbine regimen or NP chemotherapy. The drugs used were vinorelbine tartrate injection (Nanjing Chengong Pharmaceutical Co., Ltd., State Drug Approval License Number: H20093505), the dose was 25 mg/m^2, and the administration was given by injection intravenously on D1 and D8; cisplatin injection (Yunnan Bio-Guangzhou Huanhua Pharmaceutical Co., Ltd., State Drug Approval License Number: H20043889), a single dose of 30 mg/m^2 and administered by injection intravenously on D2--D4, and force diuresis with matched controlled hydration strategy; and dexamethasone sodium phosphate injection (Yufengyuan Tushan Pharmaceutical Co., Ltd., State Drug Approval License Number: H34023615), a single dose of 5 mg, quickly administered intravenously after mixed with 100 ml of normal saline and wet coated with magnesium sulfate; the course of the treatment was 21 days.

1.2.2 Experimental group

The chemotherapy regimen for the patients in this control group was the same as that of the control group. At the same time, Kanglaite injection (Zhejiang Kanglaite Pharmaceutical Co., Ltd., State Drug Approval License Number: Z10970091) was added, and the drug was started before chemotherapy. The single dose was 200 mL, 1 time/D, D1--D14, 21 days are one cycle of this treatment.

The patients of both groups were compared for treatment efficacy after two cycles of the treatment, respectively.

1.3 Efficacy evaluation criteria[3,4]

The effects of treatment on tumor control in patients were evaluated according to the efficacy evaluation criteria in solid tumors.

1. After treatment, the patient's tumor completely disappeared, and if it lasted for >4 weeks, it was classified as complete remission (CR).
2. After treatment, the maximum two-dimensional of the patient's tumor was reduced by 50% or more compared with that of before treatment. If there was no new lesion appear within 4 weeks, it was classified as partial control (PR).
3. After treatment, the maximum two-dimensional of the patient's tumor was reduced 50% than that of before treatment, or, increased within 25%, and there was no new lesion appear, it was classified as SD (stable).
4. After treatment, the patient's tumor enlarged >25% compared to that of before treatment, and there was new lesion appear, it was classified as PD (progress).

The total effective rate of tumor treatment was calculated using the formula as "(CR+PR+SD)/total number of cases×100%."

1.4 Evaluation indicators

1. Incidence rate of adverse reactions: The incidence of the adverse reaction of both groups of patients was statistically compared during the chemotherapy.
2. Immune index: 4 mL of fasting blood was taken from elbow venous of each patient before and after treatment, respectively. CD3+ and CD4+ indexes were detected by flow cytometry, and IgG and IgA indexes of the two groups' patients were detected by immunoturbidimetry.

1.5 Statistical analysis

All data were gathered and analyzed using the statistical software SPSS 20.0. The measurement data were expressed as mean ± standard deviation($\bar{x}\pm s$) and compared using *t*-test. The enumeration data were expressed as "*n*" (%) and compared using the χ^2 test. Values with $P < 0.05$ were considered statistically significant.

2 Results

2.1 Comparison of the total treatment effective rate in between the two groups

After treatment, there were two cases of CR, 15 cases of PR, 20 cases of SD, and nine cases of PD in the experimental group, and the total effective rate was 80.43% (37/46); meanwhile, there were as follows: One case was CR, 10 cases were PR, 18 cases were SD, and 17 cases were PD in the control group and the total effective rate was 63.04% (30/46). The experimental group was significantly higher than that of the control group. The data difference between the groups was $P < 0.05$. The difference was statistically significant.

2.2 Comparison of the incidence of adverse reactions in patients of the two groups

In the treatment period, the incidence of adverse reactions in the experimental group and the control group was 36.96% and 78.26%, respectively. The former was significantly lower than that of the control group. The statistical analysis showed $P < 0.05$, the difference between the two groups was statistically significant. The results are shown in Table 1.

2.3 Comparison of the immune index of patients in the two groups

Before treatment, the CD3+, CD4+, IgG, and IgA indexes of both experimental and control groups were relatively close. The statistical analysis showed $P > 0.05$, there was no statistical significance in between the groups. After treatment, the indexes of the two groups were changed, respectively, but all of the indicators in the patients of the experimental group were obviously excellent compared to that of the control group, the differences between the two groups were statistically significant, $P < 0.05$ as shown in Table 2.

3 Discussion

The onset of lung cancer is often insidious and most of the patients had developed to the advanced stage after diagnosis, and even lost the best timing/opportunity for surgery. Thus, at this time, the chemotherapy is the first

Table 1 Comparison of the incidence of adverse reactions in patients of the experimental group and control group (*n*, %)

Group	*n*, number of cases	Digestive tract reaction	Anemia	Leukopenia/ decrease in leukocyte	Thrombocytopenia/ decrease in platelet	Abnormal aminotransferase	Neurotoxicity	Adverse reaction rate
Experimental group	46	10	1	2	1	2	1	36.96% (17/46)
Control group	46	19	5	3	3	4	2	78.26% (36/46)

Table 2 Comparison of immune indexes in patients between the experimental group and control group($\bar{x}\pm s$)

Group	*n*, number of cases	Treatment	CD3+ (%)	CD4+ (%)	IgG (mg/L)	IgA (mg/L)
Experimental group	46	Before treatment	43.70±3.18	37.51±2.65	10.35±1.30	1.75±0.08
		After treatment	44.69±2.94[ab]	38.33±2.35[ab]	9.72±0.83[ab]	1.67±0.09[ab]
Control group	46	Before treatment	43.73±3.20	37.45±2.62	10.33±1.23	1.78±0.10
		After treatment	37.31±2.52[a]	32.08±2.27[a]	8.10±0.57[a]	1.28±0.04[a]

[a]$P<0.05$ is compared with each respective group before treatment, [b]$P<0.05$ is compared with the control group after treatment

choice of treatment plan. The body immunity of patients will decline as the patients were suffering painfulness from tumor, side effects of chemotherapy, etc. Tumor immunology is divided into cellular immunity and humoral immunology, while the humoral immune function of tumor patients is not dominant in the system and it is usually no significant changes. In the cellular immunity system, T lymphocytes and natural killer cells (NK cells) are the main effector cells, which are closely related to the occurrence, development, and metastasis of tumors[5].

To reduce the side effects of chemotherapy and improve the body's immunity, our department advocates adding in the Kanglaite injection to the foundation of the treatment of advanced non-small-cell carcinoma. Kanglaite injection is also a traditional Chinese medicine preparation for antitumor. The Kanglaite injection was extracted from *Coix* seed and its main component is *Coix* seed oil, which has good effect of invigorating spleen and stop diarrhea, clearing body heat and draining pus from body, oozing, and improve diuresis. This medicine can induce apoptosis of tumor cells and has a disturbing effect on the mitotic process of tumor cells and can reverse the multidrug tolerances of tumor cells[6,7]. It can also stimulate the activation IL-2 and NK cell, effectively promote the proliferation of spleen lymphocytes, and enhance the phagocytic function of macrophages, thereby achieving the purpose of improving cellular immune function. During the chemotherapy of patients with advanced NSCLC, the injection of kanglaite can reduce the cytotoxicity of chemotherapy drugs, and also help to alleviate pain and stabilize the condition. The results of this study showed that the total treatment effective rate of the experimental group was significantly higher than that of the control group. The incidence of adverse reactions in patients of the experimental group was lower than that of the control group, and the differences between groups were $P < 0.05$, with statistically significant. This result was consistent with the results of Meng *et al.*[8] and this showed that the effectiveness and safety of Kanglaite injection had fully highlighted. In addition, the study with immune indicators (CD3+, CD4+, IgG, and IgA) were better than that of the control group, the differences between the groups were $P < 0.05$, have statistically significant, and indicate that the drug can enhance the immune function of cancer chemotherapy patients.

In summary, in the chemotherapy of advanced NSCLC, the addition of Kanglaite injection can improve the effect of chemotherapy, reduce the side effects of chemotherapy, and also significantly improve the immune function of patients.

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