Proceedings of Anticancer Research, 2024, Volume 8, Issue 4
http://ojs.bbwpublisher.com/index.php/PAR
ISSN Online: 2208-3553
ISSN Print: 2208-3545

Clinical Effect of Tislelizumab Combined with Chemotherapy in the Treatment of Stage IIIb–IV Non-Small Cell Lung Cancer

Jie Jiang*

Suining County People's Hospital, Xuzhou 221000, Jiangsu Province, China

***Corresponding author:** Jie Jiang, 18762269818@139.com

Abstract: *Objective:* To analyze the therapeutic effect of tislelizumab combined with chemotherapy in patients with stage IIIb–IV non-small cell lung cancer (NSCLC). *Methods:* A total of 50 patients with stage IIIb–IV NSCLC admitted between January 2022 and January 2024 were randomly divided into two groups using a random number table. The observation group included 25 cases treated with tislelizumab combined with chemotherapy, while the reference group included 25 cases treated with conventional chemotherapy. The clinical control rate, adverse reaction rate, tumor markers, immune function indicators, and quality of life scores were compared between the two groups. *Results:* The observation group had a higher clinical control rate and a lower adverse reaction rate compared to the reference group ($P < 0.05$). Before treatment, there were no significant differences in tumor markers, immune function indicators, and quality of life scores between the two groups ($P > 0.05$). Three months after treatment, the tumor marker levels in the observation group were lower than those in the reference group. Except for $CD8^+$, all immune function indicators in the observation group were higher than those in the reference group, and the quality-of-life scores in the observation group were higher than those in the reference group ($P < 0.05$). *Conclusion:* Implementing tislelizumab combined with chemotherapy in patients with stage IIIb–IV NSCLC can improve the clinical control rate, reduce the adverse reaction rate, lower tumor marker levels, protect immune function, and improve quality of life.

Keywords: Tislelizumab; Chemotherapy; Stage IIIb–IV; Non-small cell lung cancer

Online publication: August 9, 2024

1. Introduction

Non-small cell lung cancer (NSCLC) is a common type of lung cancer with a high incidence rate. The disease often lacks typical symptoms in the early stages, leading to a high rate of missed or incorrect diagnoses. As the disease progresses, symptoms such as significant coughing, hemoptysis, and fever become evident, often indicating the disease has reached stages IIIb–IV, where treatment becomes more challenging [1,2]. Chemotherapy, primarily using the TP regimen, is a common treatment for patients with stage IIIb–IV NSCLC. It can inhibit tumor growth and prolong survival, but prolonged chemotherapy can lead to adverse reactions and

suboptimal clinical control rates. Therefore, combining chemotherapy with immunotherapy, such as the use of new drugs like tislelizumab, may reduce the cytotoxic effects of T lymphocytes, accelerate tumor cell apoptosis, effectively combat cancer, and improve disease prognosis [3]. Based on this, this study selected 50 patients with stage IIIb–IV NSCLC to evaluate the therapeutic efficacy of tislelizumab combined with chemotherapy.

2. Materials and methods

2.1. General information

The study period was from January 2022 to January 2024, involving 50 patients with stage IIIb–IV non-small cell lung cancer (NSCLC). After random division using a number table, the observation group included 25 cases (13 males and 12 females), aged 41 to 78 years, with an average age of 57.65 ± 2.19 years. The clinical staging included 11 cases in stage IIIb and 14 cases in stage IV. The reference group also included 25 cases (14 males and 11 females), aged 40 to 77 years, with an average age of 57.94 ± 2.28 years. The clinical staging included 12 cases in stage IIIb and 13 cases in stage IV. There was no significant difference in general data between the two groups ($P > 0.05$).

Inclusion criteria: Patients were diagnosed with NSCLC at stages IIIb–IV based on imaging, clinical symptoms, and signs; met the indications for chemotherapy and tislelizumab; had complete clinical data; and could fully cooperate with the study. Exclusion criteria: Patients with other malignant tumors, severe infections, allergies to the study drug, heart, liver, or kidney dysfunction, mental disorders, or those who withdrew midway through the study.

2.2. Methods

The conventional chemotherapy method for the reference group was the TP regimen: on days 1 and 8, 100 mg/m^2 of paclitaxel was administered intravenously; on day 1, carboplatin was administered at a dose of 300 mg/m^2. One cycle lasted 21 days, with continuous administration until toxicity intolerance or disease progression. The observation group received the same chemotherapy regimen, combined with tislelizumab, administered intravenously at a dose of 200 mg every 21 days, for a total of two cycles.

2.3. Observation indicators

(1) Adverse reaction rate: Including liver and kidney function damage, bone marrow suppression, neurotoxicity, and nausea/vomiting.

(2) Tumor markers: Fasting venous blood (5 mL) was collected, serum was separated, and the levels of lung tumor antigen (LTA), cytokeratin 19 fragment antigen 21-1 (CYFRA21-1), neuron-specific enolase (NSE), and squamous cell carcinoma antigen (SCC) were assessed using radioimmunoassay.

(3) Immune function indicators: Fasting venous blood (3 mL) was collected, and flow cytometry was used to assess $CD3^+$, $CD4^+$, $CD8^+$, and $CD4^+/CD8^+$ indicators.

(4) Quality of life score: The Functional Assessment of Cancer Therapy (FACT) questionnaire was used, including physical condition (28 points), emotional condition (24 points), social/family condition (28 points), and functional condition (28 points), with a total score of 108 points, scored positively.

2.4. Efficacy evaluation criteria

Complete response (CR) was defined as the complete disappearance of the tumor for more than 4 weeks; partial response (PR) was defined as a reduction in tumor size by at least 50%, sustained for more than 4 weeks; stable

disease (SD) was defined as a reduction in tumor size by 25%–50%, sustained for 4 weeks; and progressive disease (PD) was defined as no change in tumor size or an increase of more than 25%, or the discovery of new lesions. The clinical control rate was calculated as the sum of the percentages of CR, PR, and SD.

2.5. Statistical analysis

Data were processed using SPSS 28.0 software. Measurement values were compared using *t*-tests, and count values were compared using chi-squared tests. A *P*-value of less than 0.05 was considered statistically significant.

3. Results

3.1. Comparison of clinical control rates between the two groups

The clinical control rate in the observation group was higher than that in the reference group ($P < 0.05$), as shown in **Table 1**.

Table 1. Comparison of clinical control rates between the two groups [*n* (%)]

Group	CR	PR	SD	PD	Clinical control rate
Observation group ($n = 25$)	10 (40.0)	10 (40.0)	3 (12.0)	2 (8.0)	92.0 (23/25)
Reference group ($n = 25$)	5 (20.0)	8 (32.0)	4 (16.0)	8 (32.0)	68.0 (17/25)
χ^2	-	-	-	-	4.500
P	-	-	-	-	0.034

3.2. Comparison of adverse reaction rates between the two groups

The adverse reaction rate in the observation group was lower than that in the reference group ($P < 0.05$), as shown in **Table 2**.

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

Group	Hepatic and renal impairment	Bone marrow suppression	Neurotoxicity	Nausea and vomiting	Incidence
Observation group ($n = 25$)	0	0	0	1 (4.0)	1 (4.0)
Reference group ($n = 25$)	2 (8.0)	1 (4.0)	1 (4.0)	2 (8.0)	6 (24.0)
χ^2	-	-	-	-	4.153
P	-	-	-	-	0.042

3.3. Comparison of tumor marker levels between the two groups

Before treatment, there was no difference in tumor marker levels between the two groups ($P > 0.05$). Three months after treatment, the tumor marker levels in the observation group were lower than those in the reference group ($P < 0.05$), as shown in **Table 3**.

Table 3. Comparison of tumor marker levels between the two groups before and after treatment (mean ± SD)

Group	LTA (U/L)		CYFRA21-1 (ng/mL)		NSE (ng/mL)		SCC (ng/mL)	
	Before	After	Before	After	Before	After	Before	After
Observation group (n = 25)	197.98 ± 21.37	98.19 ± 6.81	5.52 ± 0.47	2.21 ± 0.38	28.49 ± 3.67	8.06 ± 1.33	47.89 ± 4.91	18.16 ± 2.06
Reference group (n = 25)	198.02 ± 20.84	112.08 ± 6.97	5.54 ± 0.49	3.68 ± 0.42	28.51 ± 3.65	14.09 ± 1.38	47.86 ± 4.86	28.17 ± 2.35
t	0.007	7.127	0.147	12.977	0.019	15.731	0.022	16.016
P	0.995	< 0.001	0.884	< 0.001	0.985	< 0.001	0.983	< 0.001

3.4. Comparison of immune function indicators between the two groups

Before treatment, there was no difference in immune function indicators between the two groups ($P > 0.05$). Three months after treatment, except for $CD8^+$, the immune function indicators in the observation group were higher than those in the reference group ($P < 0.05$), as shown in **Table 4**.

Table 4. Comparison of immune function indicators between the two groups before and after treatment (mean ± SD)

Group	CD3+ (%)		CD4+ (%)		CD8+ (%)		$CD4^+/CD8^+$	
	Before	After	Before	After	Before	After	Before	After
Observation group (n = 25)	41.83 ± 4.95	60.03 ± 6.91	28.81 ± 2.59	40.81 ± 4.26	29.69 ± 3.42	20.42 ± 3.11	0.99 ± 0.17	2.04 ± 0.32
Reference group (n = 25)	41.80 ± 4.76	53.09 ± 6.77	28.77 ± 2.56	33.17 ± 4.18	29.74 ± 3.40	23.79 ± 3.17	0.98 ± 0.16	1.49 ± 0.28
t	0.022	3.587	0.055	6.401	0.052	3.794	0.214	6.467
P	0.983	0.001	0.956	< 0.001	0.959	< 0.001	0.831	< 0.001

3.5. Comparison of quality-of-life scores between the two groups

Before treatment, there was no difference in the comparison of the quality-of-life scores of the two groups ($P > 0.05$). Three months after treatment, the quality-of-life scores in the observation group were higher than those in the reference group ($P < 0.05$), as shown in **Table 5**.

Table 5. Comparison of quality-of-life scores between the two groups before and after treatment (mean ± SD; points)

Group	Physical status		Emotional status		Social and family status		Functional status	
	Before	After	Before	After	Before	After	Before	After
Observation group (n = 25)	16.75 ± 2.19	23.95 ± 2.71	15.99 ± 2.27	20.19 ± 2.57	17.91 ± 2.43	22.37 ± 2.61	18.39 ± 2.08	23.94 ± 2.27
Reference group (n = 25)	16.72 ± 2.24	20.19 ± 2.67	15.97 ± 2.25	17.25 ± 2.53	17.95 ± 2.51	20.02 ± 2.43	18.42 ± 2.04	20.34 ± 2.23
t	0.048	4.942	0.031	4.076	0.057	3.295	0.051	5.657
P	0.962	< 0.001	0.975	< 0.001	0.955	0.002	0.959	< 0.001

4. Discussion

Lung cancer typically affects the glands and bronchial mucosa and is one of the most common types of malignancies. Non-small cell lung cancer (NSCLC) accounts for approximately 80% of lung cancer cases and can be further divided into subtypes such as squamous cell carcinoma and adenocarcinoma. The typical symptoms include cough, chest pain, and hemoptysis [4]. Compared to small cell lung cancer, NSCLC has a longer metastasis timeline, with slower tumor cell growth. The early stages of the disease often lack specific symptoms, making early diagnosis challenging, and most cases are diagnosed at stages IIIb to IV. At this point, patients have often missed the optimal window for curative surgery and typically undergo chemotherapy and immunotherapy, with the aim of extending survival and improving quality of life [5,6].

The TP regimen is a foundational chemotherapy treatment for patients with this disease. Paclitaxel can bind to albumin receptors on the cell membrane, activating caveolin and thereby increasing the intracellular concentration of the drug in tumor cells, enhancing its anti-tumor mechanism [7]. Carboplatin binds to DNA, forming various complexes that inhibit cell division, thus exerting anti-tumor effects. However, the clinical control rates of these drugs are generally moderate, and they come with significant side effects that can increase patient discomfort, necessitating the combination with other therapeutic agents [8]. Tislelizumab is a common monoclonal antibody against programmed death protein-1 (PD-1), with strong binding affinity to the PD-1 receptor, thus showing a potent anti-tumor effect.

Tislelizumab is an immune checkpoint inhibitor that interferes with the PD-1 pathway, enhancing immune response capabilities and providing effective anti-tumor effects, thus improving treatment outcomes [9]. It also reduces neovascularization, preventing rapid tumor spread or growth. When combined with paclitaxel and carboplatin, it can inhibit tumor cell division, effectively kill tumor cells, and disrupt the normal structure of tumor DNA, slowing tumor growth. The combination of multiple drugs can enhance efficacy and reduce toxicity, targeting multiple mechanisms of action, which reduces the side effects of chemotherapy drugs. Consequently, patients have higher clinical control rates and lower rates of adverse reactions [10]. In this study, the clinical control rate in the observation group was higher than in the reference group, and the adverse reaction rate was lower ($P < 0.05$).

Tislelizumab can block multiple signaling pathways in the PD-1/programmed death-ligand 1 (PD-L1) axis, inhibiting the mediation of T lymphocytes by these pathways and enhancing anti-tumor immune effects [11]. Additionally, it can regulate immune function, activate the anti-tumor immune system, reduce immune escape, and reactivate immune response mechanisms, thereby lowering tumor marker levels. In this study, three months after treatment, the tumor marker levels in the observation group were lower than those in the reference group ($P < 0.05$).

Tislelizumab's activation of the PD-1 and PD-L1 signaling pathways can reduce the sustained proliferation of T cells and inhibit the reversal of the tumor immune microenvironment associated with these pathways, enhancing T cell biological functions and improving the body's immunity [12]. In this study, except for $CD8^+$, the immune function indicators in the observation group were higher than those in the reference group ($P < 0.05$). Based on the aforementioned treatment mechanisms, this drug can achieve better therapeutic effects, thereby reducing patient discomfort and improving quality of life.

In summary, the combination of tislelizumab and chemotherapy for patients with stage IIIb to IV NSCLC can enhance therapeutic efficacy, improve tumor marker and immune function indicator levels, reduce adverse reactions, and enhance patients' quality of life.

Disclosure statement

The author declares no conflict of interest.

References

[1] Li X, Zhang Y, Yao S, et al., 2024, Clinical Study on the Treatment of Stage IIIb–IV Non-Small Cell Lung Cancer with Tislelizumab Combined with Chemotherapy. Chinese Journal of Clinical Pharmacology, 40(3): 335–339.

[2] Liu S, Liu Q, Pang Q, et al., 2024, The Effect of Tislelizumab Combined with Chemotherapy in the Treatment of Stage IIIb–IV Non-Small Cell Lung Cancer. Journal of Practical Hospital Clinical, 21(3): 112–116.

[3] Chen X, Liu T, Yang M, et al., 2022, Efficacy of Different Immune Checkpoint Inhibitors Combined with Chemotherapy in the Treatment of Non-Small Cell Lung Cancer and Their Impact on Tumor Marker Levels. Chinese Clinical and Rehabilitation Oncology, 29(7): 774–778.

[4] Zhao H, Guo C, Zhao W, 2024, Clinical Study of Tislelizumab Combined with Chemotherapy as First-Line Treatment for Advanced Non-Small Cell Lung Cancer. System Medicine, 9(7): 175–178.

[5] Lu S, Yu X, Hu Y, et al., 2023, Characteristics of Tumor Response to First-Line Treatment with Tislelizumab Combined with Chemotherapy in Locally Advanced or Metastatic Non-Squamous Non-Small Cell Lung Cancer. Chinese Journal of Oncology, 45(4): 358–367.

[6] Chen F, Liang H, Cheng G, et al., 2023, Study on the Short-Term Efficacy and Safety of Tislelizumab Combined with Platinum-Based Chemotherapy for Advanced Non-Small Cell Lung Cancer. Journal of Clinical and Experimental Medicine, 22(6): 583–587.

[7] Fu H, Nan Y, Li C, et al., 2023, The Effect of Albumin-Bound Paclitaxel and Carboplatin Combined with Tislelizumab in the Treatment of Advanced Non-Small Cell Lung Cancer. Northwest Pharmaceutical Journal, 38(4): 164–168.

[8] Zhang J, Lu Z, Zhou X, 2022, Efficacy and Impact on Immune Function of Tislelizumab Combined with GP Chemotherapy Regimen in the Treatment of Advanced NSCLC. Chinese Journal of Health Care Medicine, 24(3): 252–254.

[9] Cheng Y, Liu L, 2023, Predictive Value of NLR and MLR in the Efficacy of Tislelizumab Combined with TP Regimen for NSCLC. Anhui Medical Journal, 44(12): 1472–1477.

[10] Chen Z, 2023, Clinical Study of Tislelizumab Combined with Gemcitabine and Cisplatin in the Treatment of Advanced Lung Squamous Carcinoma. Chinese Journal of Clinical Pharmacology, 39(16): 2306–2310.

[11] Ren G, Wu X, Song X, et al., 2023, Analysis of Diagnosis and Treatment Strategies and Pharmaceutical Care for Tislelizumab-Induced Immune-Related Pneumonia. Chinese Journal of Hospital Pharmacy, 43(11): 1291–1295.

[12] Wang H, Liu Y, Li A, et al., 2024, The Effects of Tislelizumab Injection Combined with Albumin-Bound Paclitaxel and Carboplatin on Intestinal Flora, SII, and PNI in Patients with Advanced NSCLC. Progress in Modern Biomedicine, 24(2): 338–342.