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ORIGINAL ARTICLE

Efficacy of platinum drugs in the treatment of elderly patients with advanced non-small cell lung cancer and their effects on prognosis and survival

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Summary

Purpose: *This study aimed to investigate the efficacy of platinum drugs in the treatment of elderly patients with advanced non-small cell lung cancer (NSCLC) and their effects on prognosis and survival.*

Methods: *A retrospective analysis was performed on the medical records of 128 elderly patients with stage IV NSCLC admitted to Yan'an Affiliated Hospital of Kunming Medical University from January 2015 to February 2016, who were distributed to a combination group (70 patients) and a control group (58 patients) according to chemotherapy. The efficacy was evaluated after 5 cycles of chemotherapy, and the expression levels of cytokeratin 19 fragment antigen (CYFRA21-1) and carcinoembryonic antigen (CEA) before and after chemotherapy were recorded. Patients in the two groups were followed up.*

Results: *Serum CYFRA21-1 and CEA expression levels in the combination group were lower than those in the control group after 3 and 5 cycles of chemotherapy ($p<0.05$). According to the Response Evaluation Criteria in Solid Tumors (RECIST), after 3 cycles of chemotherapy there were more patients with complete response (CR) and partial response (PR) in the combination group than those in the control group ($p<0.05$); after 5 cycles of chemotherapy, patients with CR in the combination group were more than those in the control group ($p<0.05$). According to CYFRA21-1 and CEA expression levels after 5 cycles of chemotherapy, the patients were separated to a high expression group with a median survival time of 19 weeks and a low expression group with a median survival time of 26 weeks, with a statistically significant difference between the two groups ($x^2=5.617$, $p=0.018$).*

Conclusion: *In conclusion, platinum drugs are effective in the treatment of elderly patients with advanced NSCLC, which prolong their survival and improve their quality of life, and therefore are worthy of clinical promotion.*

Key words: *advanced non-small cell lung cancer, elderly, platinum drugs, prognosis, survival*

Introduction

With the highest mortality rate, the incidence and death rates of lung cancer ranks first in malignant tumors since 1985, with approximately 483,000 new patients and approximately 389,000 deaths every year [1]. The incidence rate of this disease in males is higher than that in females, which is second only to breast cancer among cancers in females. With the increasing incidence and mortality rates of lung cancer year by year, the patients in China are estimated to reach 1.15

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million by 2030, making China the country with most patients [2]. Patients with non-small cell lung cancer (NSCLC) account for approximately 83% of patients with lung cancer, and elderly patients account for approximately 30-35% of patients with NSCLC [3]. The clinical characteristics and physiological changes of elderly patients with early NSCLC are less obvious and difficult to detect, so only less than 15% of patients can be diagnosed through early examination, and then subjected to timely surgical treatment. Most elderly patients with NSCLC have already been in advanced stages when diagnosed, and missed the best treatment period and surgery opportunities, which causes poor prognosis and unsatisfactory survival [4]. So far, advanced elderly NSCLC patients are mainly treated with targeted therapy, radiotherapy and chemotherapy. However, targeted drugs are expensive and difficult to use, unacceptable for most of the patients. Local radiotherapy is limited, and systemic radiotherapy has unsatisfactory efficacy because most patients have post-treatment metastasis and recurrence [5]. Therefore, chemotherapy is the first choice for the treatment of elderly patients with advanced NSCLC.

Tumor markers are widely used in the diagnosis, efficacy evaluation and prognostic assessment of NSCLC, of which cytokeratin 19 fragment antigen (CYFRA21-1) and carcinoembryonic antigen (CEA) are clinically common [6]. According to a study [7], CYFRA21-1 has a high sensitivity for the diagnosis of NSCLC, the concentration of which increases with disease progression, so it is usually used for the diagnosis of the disease, with a high positive rate in squamous carcinoma, reflecting the prognosis and efficacy. With a high diagnostic sensitivity, CEA has a high value for the diagnosis, prognostic assessment and treatment monitoring of NSCLC, which is usually used for the efficacy evaluation [8].

Conventional therapeutics for advanced NSCLC in the elderly are gefitinib, pemetrexed and gemcitabine. Pemetrexed is a relatively novel multitargeted antifolate drug, which inhibits the activity of articular enzymes during folate-dependent metabolism in a multitargeted way, thereby inhibiting the growth and reproduction of tumor cells. However, it usually causes neutropenia, thrombocytopenia and anemia during administration, with poor objective response rate and median survival time. Therefore, finding effective chemotherapeutics with good prognosis for advanced NSCLC in the elderly is particularly important.

Platinum drugs, containing bifunctional alkylating agents, form covalent complexes with bases on DNA, thereby blocking DNA replication and transcription and inhibiting cancer cell spread [9]. As the first platinum antitumor drug on the market and a first-line drug for solid tumors, cisplatin has a molecular structure of square planar [10], which can be used as a radiosensitizer with good efficacy and extensive anti-cancer properties [11]. Carboplatin, a second-generation platinum antitumor drug and a derivative of cisplatin with good chemical stability, higher tolerance and less side effects compared with cisplatin, is mainly used for NSCLC, bladder cancer, ovarian cancer and cervical cancer [12]. Based on their different adverse reactions, cisplatin combined with carboplatin increases the total dose intensity of platinum complexes without superimposed drug toxicity, so as to improve the efficacy [13].

At present, there are few studies on advanced NSCLC in the elderly at home and abroad, and the patients' prognosis and survival are poor with unsatisfactory effects of conventional chemotherapeutics. Therefore, in this study, the effects of platinum drugs in the treatment of elderly patients with advanced NSCLC were explored, and the efficacy and survival were investigated, to provide references for the clinical practice.

Methods

Clinical information

A retrospective analysis was performed on the medical records of 128 elderly patients with stage IV NSCLC admitted to Yan'an Affiliated Hospital of Kunming Medical University from January 2015 to February 2016, who were pathologically diagnosed with NSCLC. Among them, 70 patients treated with platinum drugs formed the combination group, including 36 males and 34 females with an average age of 76.1±5.8 years. Another 58 patients treated with pemetrexed combined with cisplatin formed the control group, including 28 males and 30 females with an average age of 75.3±5.1 years. The study was conducted after being approved by the Medical Ethics Committee of Yan'an Affiliated Hospital of Kunming Medical University. Patients and their family members were informed and signed the informed consent form.

Inclusion and exclusion criteria

Inclusion criteria: Patients pathologically diagnosed with NSCLC; patients ≥ 70 years old; patients who had not received systemic therapy; patients without hereditary diseases.

Exclusion criteria: Patients with cardiovascular and cerebrovascular diseases; patients with second primary tumors; patients in Yan'an Affiliated Hospital of Kunming Medical University with recurrent NSCLC; those who had taken antibiotics within 3 months before treatment.

Administration methods

Chemotherapy in the combination group

Patients in the combination group were intravenously dripped with 75 mg/m^2 of cisplatin (Qilu Pharmaceutical Co., Ltd., SFDA Approval Number: H20023460) for 30 min on day 1, day 7, day 14 and day 21; dripped in the dark with 60 mg/kg of carboplatin (Qilu Pharmaceutical Co., Ltd., SFDA Approval Number: H20020180) by weight on day 1, day 12 and day 24, which was diluted with 0.9% normal saline injection (Xi'an Double Crane Pharmaceutical Co., Ltd., SFDA Approval Number: H61020015). Twenty-eight days was 1 cycle of chemotherapy, and patients received 5 cycles.

Chemotherapy in the control group

Patients in the control group were intravenously dripped with 500 mg/m^2 of pemetrexed disodium (Nanjing Pharmaceutical Factory Co., Ltd., SFDA Approval Number: H20080177) for 10 min on day 1, day 8 and day 16, and 75 mg/m^2 of cisplatin (Qilu Pharmaceutical Co., Ltd., SFDA Approval Number: H20023460) for 30 min on day 1, day 7, day 14 and day 21. Twenty-one days was 1 cycle of chemotherapy, and patients received 5 cycles. The patients were orally administered dexamethasone (Guangdong Huanan Pharmaceutical Group Co., Ltd., SFDA Approval Number: H44024469) 4 mg/time, twice daily and 3 days before and after the drip of pemetrexed to reduce rash reactions. At the same time, folic acid (Beijing Scrianen Pharmaceutical Co., Ltd, SFDA Approval Number: H10970079) and vitamin B12 (Reyoung Pharmaceutical Co., Ltd., SFDA Approval Number: H37022057) were used to reduce toxic effects. The patients were orally administered folic acid for at least five days within the first seven days of the drip of pemetrexed, and with folic acid 400 μg/day for 21 consecutive days after the intravenous drip of pemetrexed during the 5th cycle of chemotherapy. Vitamin B12 1000 μg/time was intramuscularly injected before the first drip of pemetrexed, and then injected every three weeks.

Detection of CEA and CYFRA21-1 expression levels

Serum collection

4 ml of fasting venous blood was extracted from patients in the two groups and centrifuged at 4000 r/min to separate serum, which was stored in a refrigerator at -20 °C and thawed at room temperature before detection.

Detection methods

In this experiment, double-antibody sandwich enzyme-linked immunesorbent assay (DAS-ELISA) was used to determine CEA and CYFRA21-1 expression levels in the combination and control groups. CEA kit was purchased from Shanghai Fusheng Industrial Co., Ltd. with an Item No. of FS-0501, and CYFRA21-1 kit was from Shanghai Yuanmu Biological Technology Co., Ltd. with an Item No. of YM-S1108. The experimental operations were strictly carried out according to the instructions. The optical density (OD) value corresponding to standard concentration was used to calculate the ratio

Table 1. Comparison of baseline information

Category	*Combination group (n=70) n (%)*	*Control group (n=58) n (%)*	x^2	*p*
Age, years				
<75	23 (32.86)	18 (31.03)	0.048	0.851
≥75	47 (67.14)	40 (68.97)		
Gender				
Male	36 (51.43)	28 (48.28)	0.126	0.430
Female	34 (48.57)	30 (51.72)		
History of smoking				
Yes	55 (78.57)	47 (81.03)	0.119	0.827
No	15 (21.43)	11 (18.97)		
History of alcoholism				
Yes	31 (44.29)	24 (41.38)	0.109	0.858
No	39 (55.71)	34 (58.62)		
Lymph node metastasis				
Yes	62 (88.57)	48 (82.76)	0.887	0.445
No	8 (11.43)	10 (17.24)		
Histological type				
Squamous carcinoma	33 (47.14)	26 (44.83)	0.068	0.859
Adenocarcinoma	37 (52.86)	32 (55.17)		
Differentiation				
Moderate	21 (30.00)	14 (24.14)	0.549	0.551
High	49 (70.00)	44 (75.86)		

of OD value of the sample to that of the standard, and products with accuracy of more than 99% were considered as qualified. An automatic microplate reader was used to calculate the linear regression equation, and the sample concentration was calculated based on the OD value measured.

Clinical efficacy evaluation

Criteria for clinical efficacy evaluation

According to the Response Evaluation Criteria in Solid Tumors (RECIST) [14], the efficacy of chemotherapy during the 3rd and 5th cycles was evaluated. Complete response (CR): All target lesions disappeared, and the short diameters of pathological lymph nodes reduced to less than 10 mm. Partial response (PR): The sum of target lesion diameters reduced by at least 30% compared with the baseline level. Stable disease (SD): The reduction of target lesions was between PR and progressive disease (PD). PD: With the minimum value of the sum of target lesion diameters as the reference, the sum of diameters increased by more than 20% or new lesion(s) appeared. The clinical efficacy: CP>PR>SD>PD.

Prognostic assessment and interview for survival

Prognostic assessment

According to ECOG performance status score [15], the prognosis of elderly patients with advanced NSCLC was evaluated 3 months after discharge. 0: Patients had normal activity, not different with before onset. 1: Free to walk, patients can engage in light physical activities, including general housework or office work. 2: Free to walk, patients can take care of themselves and get out of bed for more than half of the day without the ability to work. 3: Partially taking care of themselves, patients stayed in bed or wheelchair for more than half of the day. 4: Bedridden, patients cannot take care of themselves. 5: Patients died. The prognosis was 0>1>2>3>4>5.

Interview for survival

After 5 cycles of chemotherapy, elderly patients with advanced NSCLC after discharge were interviewed weekly, with death as the deadline. The patients' survival was recorded through telephone or home follow-ups, and the follow-up ended in May 2017.

Statistics

SPSS17.0 (Shanghai Yuchuang Network Technology Co., Ltd.) statistical software was used for data analysis. Count data were expressed as percentage, and chi-square test was used for comparison of count data between groups. Used were Mann-Whitney U test for comparison of efficacy between groups, Kaplan-Meier for survival analysis, and Log-rank for comparison of survival between 2 groups test. When $p<0.05$, the difference was statistically significant.

Results

Comparison of baseline information

There were no statistically significant differences between the combination and control groups in terms of age, gender, history of smoking, history of alcoholism, lymph node metastasis, cancer cell differentiation and histological type ($p<0.05$). More details are shown in Table 1.

Table 2. Comparison of CYFRA21-1 expression level before and after chemotherapy

	Combination group (n=70)	*Control group (n=58)*	*t*	*p*
Before chemotherapy	85.36±13.45[b,c]	88.31±11.53[b,c]	1.317	0.190
Three cycles of chemotherapy	68.51±9.53[a,c]	75.48±10.04[a,c]	4.020	<0.01
Five cycles of chemotherapy	43.54±7.22[a,b]	60.35±8.16[a,b]	12.360	<0.01
F	288.00	114.10		
p	<0.01	<0.05		

[a]indicates a statistically significant difference compared with before chemotherapy ($p<0.05$); [b]indicates a statistically significant difference compared with 3 cycles of chemotherapy ($p<0.05$); c indicates a statistically significant difference compared with 5 cycles of chemotherapy ($p<0.05$).

Table 3. Comparison of CEA expression level before and after chemotherapy

	Combination group (n=70)	*Control group (n=58)*	*t*	*p*
Before chemotherapy	5.36±0.94[b,c]	5.41±0.92[b,c]	0.303	0.763
Three cycles of chemotherapy	4.14±0.73[a,c]	4.73±0.74[a,c]	4.524	<0.01
Five cycles of chemotherapy	3.09±0.52[a,b]	3.91±0.66[a,b]	7.861	<0.01
F	164.00	51.59		
p	<0.01	<0.05		

[a]indicates a statistically significant difference compared with before chemotherapy ($p<0.05$); [b]indicates a statistically significant difference compared with 3 cycles of chemotherapy ($p<0.05$); c indicates a statistically significant difference compared with 5 cycles of chemotherapy ($p<0.05$).

Efficacy of platinum drugs in the treatment of elderly patients with advanced NSCLC

Comparison of CYFRA21-1 expression level before and after chemotherapy

Before chemotherapy, there was no statistically significant difference between the two groups with respect to CYFRA21-1 expression level (t=1.317, p=0.190), which after 3 and 5 cycles of chemotherapy was lower than that before chemotherapy in the two groups, showing a downward trend (p<0.05). CYFRA21-1 expression level in the combination group was lower than that in the control group after 3 and 5 cycles of chemotherapy (p<0.05). More details are shown in Table 2.

Comparison of CEA expression level before and after chemotherapy

Before chemotherapy, there was no statistically significant difference between the two groups with respect to CEA expression level (t=0.303, p=0.763), which after 3 and 5 cycles of chemotherapy was lower than that before chemotherapy in the two groups, showing a significant downward trend (p<0.05). CEA expression level in the combination group was lower than that in the control group after 3 and 5 cycles of chemotherapy (p<0.05). More details are shown in Table 3.

Efficacy after three cycles of chemotherapy

After 3 cycles of chemotherapy, according to RECIST, there were 6 patients with PD, 11 with SD, 38 with PR and 15 with CR in the combination group; there were 16 patients with PD, 24 with SD, 14 with PR and 4 with CR in the control group. Compared with the control group, the combination group had significantly less patients with PD and SD, but significantly more patients with PR and CR, with statistically significant differences between the two groups (p<0.001). More details are shown in Table 4.

Efficacy after five cycles of chemotherapy

After 5 cycles of chemotherapy, according to RECIST, there were 1 patient with PD, 4 with SD, 18 with PR and 47 with CR in the combination group; there were 7 patients with PD, 10 with SD, 28 with PR and 13 with CR in the control group. Compared with the control group, the combination group had significantly less patients with PD and SD, but significantly more patients with PR and CR, with statistically significant differences between the two groups (p<0.001). More details are shown in Table 5.

Prognosis and survival

Prognosis three months after chemotherapy

According to ECOG performance status score 3 months after chemotherapy, in the combination group, there were 10 patients in stage 0, 16 in stage 1, 24 in stage 2, 10 in stage 3, 8 in stage 4 and 2 in stage 5. In the control group, there was no patient in stage 0, 4 in stage 1, 8 in stage 2, 20 in stage 3, 18 in stage 4 and 8 in stage 5. Compared with the control group, the combination group had

Table 4. Efficacy after three cycles of chemotherapy

Category	*Combination group (n=70) n (%)*	*Control group (n=58) n (%)*	*Z*	*p*
RECIST			4.792	<0.001
PD	6 (8.57)	16 (27.59)		
SD	11 (15.71)	24 (41.38)		
PR	38 (54.29)	14 (24.14)		
CR	15 (21.43)	4 (6.90)		

Table 5. Efficacy after five cycles of chemotherapy

Category	*Combination group (n=70) n (%)*	*Control group (n=58) n (%)*	*Z*	*p*
RECIST			-5.195	<0.001
PD	1 (1.43)	7 (12.07)		
SD	4 (5.71)	10 (17.24)		
PR	18 (25.71)	28 (48.28)		
CR	47 (67.14)	13 (22.41)		

significantly less patients in stages 3, 4 and 5, but significantly more patients in stages 0, 1 and 2, with statistically significant differences between the two groups (p<0.05). More details are shown in Table 6.

Prognosis five months after chemotherapy

According to ECOG performance status score 5 months after chemotherapy, in the combination group, there were 6 patients in stage 0, 11 in stage 1, 19 in stage 2, 5 in stage 3, 8 in stage 4 and 21 in stage 5. In the control group, there were 0 in stage 0, 1 in stage 1, 2 in stage 2, 12 in stage 3, 15 in stage 4 and 28 in stage 5. Compared with the control group, the combination group had significantly less patients in stages 3, 4 and 5, but significantly more patients in stages 0, 1 and 2, with statistically significant differences between the two groups (p<0.05). More details are shown in Table 7.

Survival of patients in the combination and control groups

A 43-week follow-up was performed on patients in the combination and control groups, ending in May 2017. Up to the end of the follow-up, 59 patients in the combination group died, with a median survival time of 33 weeks, and 57 patients in the control group died, with a median survival time of 27 weeks, with a statistically significant difference between the two groups (x^2=180.388, p<0.001). More details are shown in Figure 1.

Survival of patients in the high and low expression groups

According to CYFRA21-1 and CEA expression levels after 5 cycles of chemotherapy, 71 patients with CYFRA21-1 ≥ 50.00 or CEA ≥ 3.50 were in the high expression group, and 57 patients with CYFRA21-1 < 50.00 and CEA < 3.50 were in the low expression group. A 43-week follow-up was performed on patients in the two groups, ending in May 2017. Up to the end of the follow-up, 69 patients in the high expression group died, with a median survival time of 19 weeks, and 47 patients in the low expression group died, with a median survival time of 26 weeks, with a statistically significant difference between the two groups (x^2=6.964, p=0.008). More details are shown in Figure 2.

Discussion

The increasing incidence and mortality rates of lung cancer in recent years have seriously threatened human health and life [16]. The patients have been in the advanced stage when they have significant clinical symptoms or physiological responses. Patients with NSCLC account for more than 80% of patients with lung cancer. NSCLC mainly occurs

Table 6. Prognosis three months after chemotherapy

Category	*Combination group (n=70) n (%)*	*Control group (n=58) n (%)*	x^2	*p*
ECOG				
0	10 (14.29)	0 (0.00)	8.988	0.002
1	16 (22.86)	4 (6.90)	6.129	0.015
2	24 (34.29)	8 (13.79)	7.104	0.008
3	10 (14.29)	20 (34.48)	7.210	0.011
4	8 (11.43)	18 (31.03)	7.532	0.008
5	2 (2.86)	8 (13.79)	4.602	0.046

Table 7. Prognosis five months after chemotherapy

Category	*Combination group (n=70) n (%)*	*Control group (n=58) n (%)*	x^2	*p*
ECOG				
0	6 (8.57)	0 (0.00)	5.216	0.032
1	11 (15.71)	1 (1.72)	7.307	0.006
2	19 (27.14)	2 (3.45)	12.985	<0.001
3	5 (7.14)	12 (20.69)	5.054	0.035
4	8 (11.43)	15 (25.86)	4.483	0.040
5	21 (30.00)	28 (48.28)	4.484	0.045

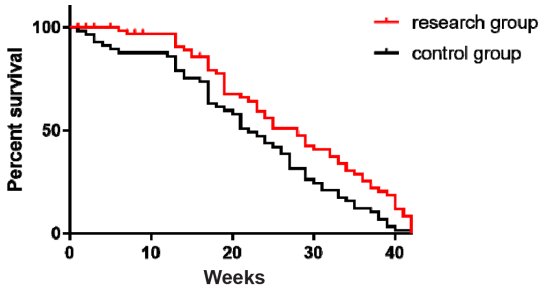

Figure 1. Comparison of survival between combination and control groups (p<0.001).

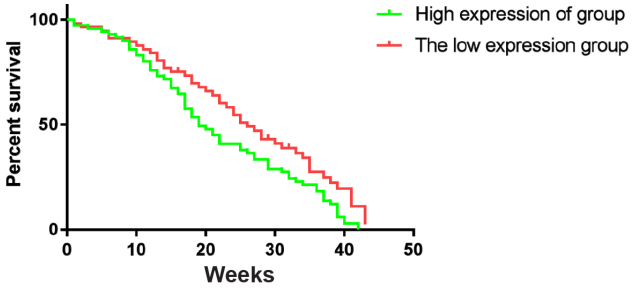

Figure 2. Comparison of survival between high and low expression groups. According to Kaplan-Meier method, the median survival time was 19 weeks in the high expression group and 26 weeks in the low expression group, with a statistically significant difference between the two groups (x^2=5.617, p=0.018). Up to May 2017, 69 patients in the high expression group died, with a mortality rate of 97.18%, and 47 patients in the low expression group died, with a mortality rate of 82.56% (p=0.018).

in the elderly, and approximately two-thirds of the elderly patients are in the advanced stage when diagnosed [17]. The function and structure of human organs gradually declines with age, followed by changes of pharmacokinetics, which causes a decrease in cardiopulmonary reserve capacity and degradation of hematopoietic function of bone marrow [18]. Elderly patients with advanced NSCLC are usually accompanied by diabetes mellitus, hypertension, hyperglycemia and Alzheimer's disease [19], which affects the treatment of the disease. Therefore, studies on the efficacy and prognostic survival of elderly patients with advanced NSCLC are valued.

With an effect of broad-spectrum anti-cancer agents, cisplatin causes less damage to normal cells while effectively destroys cancer cells, which treats tumors through intravenous injection, intrathoracic and intraperitoneal injection [20]. Carboplatin, a second-generation platinum drug with better chemical stability, is obtained through replacing chlorine atoms with carboxyl in cisplatin [21], which has less digestive tract reactions and bone marrow depression during treatment compared with cisplatin. Cisplatin combined with carboplatin improves the efficacy without superimposed toxic and side effects [22]. Pemetrexed has a strong effect on bone marrow suppression, which is filtered by glomerulus and excreted from renal tubules, seriously damaging renal function [23]. Elderly patients have poor hematopoietic function and declined physiological function of organs, so greater toxic and side effects are unbearable to them.

According to a study by Zhang et al [24], compared with gemcitabine, cisplatin in the treatment of NSCLC has less adverse reactions and better tolerance and efficacy, which improves the safety and disease prognosis. According to a study by Liao et al [25], compared with cisplatin alone, low-dose cisplatin combined with carboplatin in the treatment of advanced carcinoma of tongue has better efficacy, significantly lower incidence rate of adverse reactions of the gastrointestinal tract and higher effective rate of treatment. The results of the above studies are similar to this study.

In this study, compared with the control group, the combination group had more patients with PR and CR after 3 cycles of chemotherapy (p<0.05), and more patients with CR after 5 cycles of chemotherapy (p<0.05), and patients with CR in the combination group accounted for 67.14% of the total number. These findings indicate that the efficacy of platinum drugs is better than that of pemetrexed in the treatment of elderly patients with advanced NSCLC. According to prognostic assessment, 3 months after chemotherapy, the number of patients in stages 0, 1 and 2 in the combination group was 10, 16 and 24, higher than 0, 4 and 8 in the control group (p<0.05); 5 months after chemotherapy, the number of patients in stages 0, 1 and 2 in the combination group was 6, 11 and 19, higher than 0, 1 and 2 in the control group (p<0.05). These findings indicate that the prognosis of elderly patients with advanced NSCLC treated with platinum drugs is better than that of patients treated with pemetrexed. A 43-week follow-up was performed on elderly patients with advanced NSCLC weekly. Up to the end of the follow-up, 59 patients in the combination group died, accounting for 84.29%, with a median survival time of 33 weeks; 57 patients in the control group died, accounting for 98.28%, with a median survival time of 27 weeks. The differences between the two groups were statistically significant (p<0.05). It is suggested that the survival of elderly patients with advanced NSCLC treated with platinum drugs is better than that of patients treated with pemetrexed.

However, there are limitations in this study. For example, a retrospective analysis is performed in this study; data of clinical and special examina-

tions are limited; cases admitted are limited, so there is no enough data for statistical comparison. Therefore, relevant information will be further collected and a high-density interview will be conducted weekly, to accurately record patients' survival and obtain more accurate results.

In summary, platinum drugs are effective in the treatment of elderly patients with advanced NSCLC, which prolong the survival time and improve the prognosis, and is worthy of clinical promotion.

Conflict of interests

The authors declare no conflict of interests.

References

1. Tian G. Analysis of lung cancer incidence in malignancy. Translat Med J 2013;5:51-3.
2. Wang GP, Zeng SQ, Ping HE. Investigation and Analysis of Incidence and Mortality of Lung Cancer in Wenjiang District, Chengdu City in 2008-2010. Pract Prevent Med 2013;1:38-40.
3. Liu L, Wei S. [Research Progress of KRAS Mutation in Non-small Cell Lung Cancer]. Zhongguo Fei Ai Za Zhi 2018;21:419-24.
4. Gandhi L, Rodriguez-Abreu D, Gadgeel S et al. Pembrolizumab plus chemotherapy in metastatic non–small-cell lung cancer. N Engl J Med 2018;378:2078-92.
5. Clarey J, Kao SC, Clarke SJ, Vardy J. The eligibility of advanced non-small-cell lung cancer patients for targeted therapy clinical trials. Ann Oncol 2012;23:1229-33.
6. Chen F, Wang XY, Han XH , Wang H, Qi J. Diagnostic value of Cyfra21-1, SCC and CEA for differentiation of early-stage NSCLC from benign lung disease. Int J Clin Exp Med 2015;8:11295-300.
7. Edelman MJ, Hodgson L, Rosenblatt PY et al. CYFRA 21-1 as aprognostic and predictive marker in advanced non-small-cell lung cancer in a prospective trial: CALGB 150304. J Thorac Oncol 2012;7:649-54.
8. Jung M, Kim SH, Lee YJ et al. Prognostic and predictive value of CEA and CYFRA 21-1 levels in advanced non-small cell lung cancer patients treated with gefitinib or erlotinib. Exp Ther Med 2011;2:685-93.
9. Waalboer DC, Muns JA, Sijbrandi NJ et al. Platinum(II) as bifunctional linker in antibody-drug conjugate formation: coupling of a 4-nitrobenzo-2-oxa-1,3-diazole fluorophore to trastuzumab as a model. Chem Med Chem 2015;10:797.
10. Zhang J, Ying KE, Shen J. Recent progress in research and development of antitumor platinum drugs and their situation on the market. Shanghai Med Pharmaceut J 2013;23:56-63.
11. Çiğdem Y, Değim Z, Şükran Y. Development of Cisplatin-loaded Liposome and Evaluation of Transport Properties Through Caco-2 Cell Line. Turk J Pharmaceut Sci 2016;13:95-108.
12. Matsuoka A, Ando Y. [Nephropathy in Patients Undergoing Cancer Drug Therapy - Platinum Derivatives (Cisplatin and Carboplatin)]. Gan To Kagaku Ryoho 2017;44:200-03.
13. Faridaalaee G, Rahmani SH, Mahboubi A. Hypersensitivity and cross-reactivity to cisplatin and carboplatin. J Emergency Pract Trauma 2016;2:58-61.
14. Shuster A, Huynh TJ, Rajan D K et al. Response Evaluation Criteria in Solid Tumors (RECIST) Criteria. Journal of Vascular & Interventional Radiology 2013;24:805-12.
15. Mineo JF, Bordron A, Baroncini M et al. Prognostic factors of survival time in patients with glioblastoma multiforme: A multivariate analysis of 340 patients. Acta Neurochir (Wien) 2007;149:245-52.
16. Mukesh K, Kumar RV, Dev TRK et al. Pneumonectomy in the Indian scenario-a review of current indications and results. Indian J Thor Cardiovasc Surg 2015;31:1-6.
17. Pathak AK, Bhutani M, Mohan A, Guleria R, Bal S, Kochupillai V. Non small cell lung cancer (NSCLC): current status and future prospects. Indian J Chest Dis Allied Sci 2004;46:191-203.
18. Libertini G. Non-Programmed Versus Programmed Aging Paradigm. Curr Aging Sci 2015;8:56-8.
19. Gualberto A, Pollak M. Clinical development of inhibitors of the insulin-like growth factor receptor in oncology. Curr Drug Targets 2009;10:923-36.
20. Kim H, Lee G, Sohn SH, Lee C, Kwak JW, Bae H. Immunotherapy with methyl gallate, an inhibitor of Treg cell migration, enhances the anti-cancer effect of cisplatin therapy. Korean J Physiol Pharmacol 2016;20:261-8.
21. Gozlan I, Rotstein A, Avisar D. Carboplatin-Degradation Products Formed Under Deliberated and Non-deliberated Laboratory Experiments: Structural Elucidation. Water Air Soil Pollution 2014;225:1-12.
22. Bing L, Yong-Feng S, Qin YD, Zheng Z. Adverse Reactions Compared of Nida and Carboplatin combined with Fluorouracil Concurrent Chemotherapy in Treatment of Advanced Nasopharyngeal. Guide China Med 2013;30:311-2.
23. Wang LM, Zhang Y, Ren SY. Analgesic Effect of Pamidronate Disodium on Bone Cancer Pain Model in Mice and its Molecular Mechanism. Pharmaceut J Chin Peoples Liberation Army 2018;1:27-30.
24. Zhang HF. Pemetrexed Disodium for Injection combined with Cisplatin treatment of Non small-cell carcinoma. Chin J Trauma Disabil Med 2013;23:141-4.
25. Liao Y, Cao XQ. Clinical trial of cisplatin combined with carboplatin in patients with advanced glottic carcinoma. Chin J Clin Pharmacol 2016;22:34-7.