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Research article

Fei Jin Sheng formula and its effectiveness in treating advanced non-small cell lung cancer: An observational study

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ABSTRACT

Objective: This study involved evaluating the efficacy of the Feijinsheng formula in the therapeutic management of patients with advanced non-small cell lung cancer (NSCLC).
Methods: We extracted the medical records of patients with advanced NSCLC undergoing treatment in the oncology department at the Second Affiliated Hospital of Zhejiang Chinese Medicine University from the medical record system. After applying inclusion and exclusion criteria, clinical data of 150 patients were collected. The patients were stratified into two groups based on their usage of the Feijinsheng formula, comprising 69 cases in the Exposed group and 81 cases in the Control group. A comparative analysis of the survival time difference between the two groups was conducted.
Results: The data between the two groups exhibited similarity ($p > 0.05$). Following treatment, the Exposed group demonstrated a notably prolonged overall survival time compared to the Control group ($p < 0.05$). While the Exposed group displayed a higher objective remission rate than the Control group, this disparity did not reach statistical significance ($p > 0.05$).
Conclusion: The Feijinsheng formula extended the duration of survival of patients with advanced NSCLC.

1. Introduction

Lung cancer stands as the foremost contributor to cancer-related fatalities globally [1], comprising nearly 20 % of all cancer-related fatalities [1,2]. The global incidence of new lung cancer cases was estimated at 2.5 million in 2022, reflecting a rapid increase in recent years [1]. Lung cancer represents a complex and multifaceted disease, categorized into non-small cell lung cancer (NSCLC) and small

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cell lung cancer (SCLC) [3], constituting approximately 84 % and 13 % of lung cancer cases, respectively [4]. Merely 25%–30 % of individuals diagnosed with NSCLC are identified at early stages [5], with the majority diagnosed during advanced stages [6]. Despite the availability of numerous treatments for NSCLC, the majority of therapeutic approaches exhibit limitations, particularly in cases of advanced disease where patients derive limited benefits [7–11]. Consequently, the prognosis for NSCLC remains unfavorable. Hence, there is an urgent demand for the exploration and development of novel anti-NSCLC therapies.

In China, traditional Chinese medicine (TCM) stands as a valuable treasure, possessing distinct characteristics and advantages in managing intricate diseases, backed by millennia of clinical experience [12]. Recognized for its extensive historical application, TCM is acknowledged for providing distinctive methodologies in addressing complex diseases [12]. Empiricla investigations have demonstrated the anti-NSCLC efficacy of TCM. In a study by Xu et al. [13,14], Ze-Qi-Tang, a traditional Chinese herbal formula employed for respiratory system ailments, was found to impede the proliferation of NSCLC cells, presenting itself as a viable alternative treatment for NSCLC with evident anti-lung cancer effects [15]. Recent research has delved into exploring various TCM-derived compounds for their potential impacts on lung cancer [15]. For example, Lou et al. reported that ginkgetin, derived from Ginkgo biloba leaves, enhances cisplatin-induced anti-lung cancer effects by inducing ferroptosis [16].

Drawing on millennia of clinical application and the contemporary advancements in TCM research, seasoned TCM practitioners have formulated the Feijinsheng formula (FJS) for managing NSCLC [17,18]. Substantiated by a clinical study, FJS demonstrated a

Table 1
Clinical characteristics of patients in two groups.

Characteristics	Levels	FJS group (n = 61)	Control group (n = 89)	Statistics	*P*
Sex [Case (%)]	Male	40 (65.6 %)	55 (61.8 %)	$\chi^2 = 0.222$	0.637
	Female	21 (34.4 %)	34 (38.2 %)		
Age (Year)	Mean ± SD	67.95 ± 11.37	67.17 ± 10.72	t = 0.428	0.669
Age group	<60	14 (23 %)	20 (22.5 %)	$\chi^2 = 4.160$	0.245
	60–69	17 (27.9 %)	37 (41.6 %)		
	70–79	20 (32.8 %)	18 (20.2 %)		
	≥80	10 (16.4 %)	14 (15.7 %)		
Smoking history	no	31 (50.8 %)	48 (53.9 %)	$\chi^2 = 0.141$	0.708
	yes	30 (49.2 %)	41 (46.1 %)		
Drinking history	no	44 (72.1 %)	65 (73 %)	$\chi^2 = 0.015$	0.903
	yes	17 (27.9 %)	24 (27 %)		
TNM	III	8 (13.1 %)	12 (13.5 %)	$\chi^2 = 0.004$	0.948
	IV	53 (86.9 %)	77 (86.5 %)		
Pathological pattern	squamous	17 (27.9 %)	19 (21.3 %)	$\chi^2 = 0.844$	0.358
	adenocarcinoma	44 (72.1 %)	70 (78.7 %)		
EGFR mutations	no	37 (60.7 %)	50 (56.2 %)	$\chi^2 = 0.298$	0.585
	yes	24 (39.3 %)	39 (43.8 %)		
PS	Mean ± SD	2.34 ± 0.81	2.34 ± 0.98	t = 0.047	0.962
WBC	Median (IQR)	7.3 (5.4, 9.0)	7.10 (4.8,9.0)	U = 2624	0.731
HB	Mean ± SD	116.95 ± 19.11	108.30 ± 25.12	t = 2.274	0.018
PLT	Median (IQR)	239.0 (179.0, 311.0)	203.0 (152.0, 262.0)	U = 2188	0.044
ALT	Median (IQR)	16.0 (11.0, 25.0)	17.00 (11.0, 25.0)	U = 2617	0.710
AST	Median (IQR)	22.0 (18.0, 29.0)	24.00 (18.0, 29.0)	U = 2657	0.827
ALB	Mean ± SD	33.46 ± 5.06	32.54 ± 5.20	t = 1.067	0.288
TG	Median (IQR)	0.95 (0.74, 1.38)	1.06 (0.82, 1.44)	U = 2422	0.264
TCHO	Mean ± SD	4.29 ± 1.00	4.46 ± 1.550	t = −0.766	0.409
CEA	Median (IQR)	11.8 (4.0, 50.2)	15.0 (5.10, 117.1)	U = 2417	0.256
CEA group	normal	19 (31.1 %)	22 (24.7 %)	$\chi^2 = 0.753$	0.386
	abnormal	42 (68.9 %)	67 (75.3 %)		
CA19-9	Median (IQR)	13.20 (5.6, 57.2)	16.10 (5.3, 133.0)	U = 2588	0.551
CA19-9 group	normal	43 (70.5 %)	55 (61.8 %)	$\chi^2 = 1.210$	0.272
	abnormal	18 (29.5 %)	34 (38.2 %)		
Cyfra21-1	Median (IQR)	5.37 (2.55, 23.91)	6.35 (3.03, 21.10)	U = 2570	0.582
Cyfra21-1 group	normal	14 (23 %)	16 (18 %)	$\chi^2 = 0.559$	0.454
	abnormal	47 (77 %)	73 (82 %)		
SCC	Median (IQR)	1.10 (0.60, 2.20)	1.20 (0.60, 2.20)	U = 2651	0.808
SCC group	normal	39 (63.9 %)	51 (57.3 %)	$\chi^2 = 0.663$	0.415
	abnormal	22 (36.1 %)	38 (42.7 %)		
Chemotherapy	no	25 (41 %)	35 (39.3 %)	$\chi^2 = 0.041$	0.839
	yes	36 (59 %)	54 (60.7 %)		
Radiotherapy	no	44 (72.1 %)	53 (59.6 %)	$\chi^2 = 2.510$	0.113
	yes	17 (27.9 %)	36 (40.4 %)		
Targeted therapy	no	26 (42.6 %)	44 (49.4 %)	$\chi^2 = 0.675$	0.411
	yes	35 (57.4 %)	45 (50.6 %)		
Immunotherapy	no	56 (91.8 %)	76 (85.4 %)	$\chi^2 = 1.410$	0.235
	yes	5 (8.2 %)	13 (14.6 %)		

Notes: TNM: tumor-node-metastasis; PS: performance status; NRS: numeric rating scales; WBC: white blood cell; HB: haemoglobin; PLT: platelet count; ALT: alanine transaminase; AST: glutamic oxalic transaminase; ALB: albumin; TG: triglyceride; TCHO: total cholesterol; CEA: carcinoembryonic antigen; CA19-9: carbohydrate antigen 19–9; Cyfra21-1: cytokeratin 19 fragment 21-1; SCC: squamous cell carcinoma associated antigen.

significant anti-NSCLC effect. In their research, Zhou et al. revealed that the integration of FJS with chemotherapy markedly reduced the pathological burden, elevated Karnofsky scores, and ameliorated the clinical symptoms of patients [19,20]. However, there remains a lack of objective assessment regarding the impact of FJS on extending the prognosis of individuals with advanced NSCLC.

In this investigation, we carried out a retrospective cohort study assessing the effectiveness of FJS in treating advanced NSCLC, focusing on the primary clinical endpoint of overall survival (OS). Secondary outcomes included the objective response rate (ORR). We aim to contribute additional evidence supporting the use of FJS in the treatment of advanced NSCLC, facilitating its more optimal application in patients with this condition, in the future.

2. Methods

2.1. Study population and initial screening

This retrospective cohort study was conducted exclusively at the Second Affiliated Hospital of Zhejiang Chinese Medicine University, focusing on inpatients at the oncology department, during the period spanning January 2014 to December 2021. Inclusion criteria encompassed patients pathologically or cytologically diagnosed with NSCLC, specifically adenocarcinoma or squamous carcinoma. Evaluation, following RECIST (version 1.1) guidelines for solid tumors, involved criteria such as complete response (CR), partial response (PR), stable disease (SD), and progressive disease (PD). Participants were required to exhibit at least one measurable lesion on imaging, manifest clarity on imaging after two treatment cycles, and not present serious liver or kidney failure, cardiovascular or cerebrovascular diseases. Additionally, comprehensive medical records were a prerequisite for inclusion. Exclusion criteria involved a survival time of less than 3 months, individuals with mental health disorders, pregnant or lactating women, and patients with more than two concurrent cancers. Approval for this study was granted by the ethics review committee of the Second Hospital of Zhejiang Chinese Medicine University ([2022]101–01).

We obtained baseline data from electronic medical records, encompassing information such as sex, age, smoking and drinking history, pathological type, transmission network management (TNM), physical status (PS), and laboratory tests (Table 1).

2.2. Study endpoints and follow-up

The primary outcome measure was OS, delineated as the duration from the identification of any pertinent deaths or exclusions (until 2022-06-30) to the diagnosis of mid-late NSCLC. Secondary outcome parameters included the ORR, computed using the formula: (number of CR + number of PR)/total number of individuals.

We collected survival data through telephone follow-up. In cases where no primary endpoint event had transpired by the specified follow-up cut-off date (2022-06-30), that cut-off date was employed. Participants whose family members were uncooperative or unreachable during the telephone follow-up were designated as lost to follow up and noted as deletions. A thorough analysis was carried out to ascertain whether variables such as sex, age, smoking and drinking history, pathological type, TNM stage, PS, laboratory tests, treatment methods, and other factors in the Exposed group served as prognostic indicators for advanced NSCLC.

2.3. Feijinsheng formula composition

FJS used in this study, consists of the following medical plants:

Herba Euphorbiae Helioscopiae - Ze Qi (30g); Herba Salviae Chinensis - Shi Jian Chuan (30g); Radix Peucedani - Qian Hu (10g); Rhizoma Pinelliae - Jiang Ban Xia (9g); Radix Scutellariae - Huang Qin (10g); Radix et Rhizoma Ginseng - Ren Shen Pian (9g); Radix et Rhizoma Glycyrrhizae Praeparata cum Melle - Gan Cao (6g); Ramulus Cinnamomi - Gui Zhi (9g); Nidus Vespae - Chao Feng Fang (15g); Taxus chinensis var - Hong Dou Shan (8g); Rhizoma Arisaematis praeparatum - Zhi Nan Xing (6g). This composition was administered to patients as part of their treatment regimen. Medication regimen: Decoction of FJS, 150 ml, should be taken warm twice a day, in the morning and evening. Each course lasts for 14 days, and it should be taken continuously for at least 2 courses. The herbal formulation used in this traditional Chinese medicine compound is safe in terms of both the herbs and their dosages.

2.4. Statistical analysis

Statistical analyses were executed utilizing SPSS version 26.0 and R version 4.0.2, with the significance level (α) for statistical tests established at 0.05.

Continuous variables meeting the criteria of normality are presented as mean ± standard deviation, and intergroup comparisons were conducted using an independent sample *t*-test. In instances where continuous variables did not meet the normality assumption, the representation included median and quartile [Median (IQR)], and intergroup comparisons were performed using the Wilcoxon rank-sum test. Classification variables are expressed as the number of cases and relative frequencies, with intergroup comparisons carried out using the chi-squared test.

We employed Kaplan–Meier curves and log-rank tests to illustrate the survival rates of both the Exposed group and the Control group, analyzing discrepancies in cumulative mortality between the two groups. Utilizing patient characteristics, laboratory test results, and treatment methods as independent variables, univariate analysis was conducted through the Cox proportional hazard regression model. In this analysis, FJS served as the primary study variable, with variables demonstrating $p < 0.05$ in the univariate analysis utilized as covariables. These variables were incorporated into the multivariate Cox proportional hazard regression model and

the impact of FJS on patient survival was investigated through the stepwise regression method. The predictive capability of the multifactor model for 1-year, 3-year, and 5-year mortality risks was assessed using receiver operating characteristic curves (ROC) and the area under the ROC (AUC). The multifactor model is depicted graphically as a nomogram representing 1-year, 3-year, and 5-year mortality risks (Fig. 1).

Furthermore, preliminary screening of factors influencing the ORR was conducted through univariate analysis. Variables exhibiting $p < 0.05$ in the analysis were subsequently incorporated into the multivariate logistic regression to further investigate the influencing factors of ORR. Observe whether FJS has an effect on the objective response rate. Further analyze whether FJS exerts its anti-tumor effects by inhibiting the ORR.

3. Results

3.1. Baseline clinical characteristics of the study cohort

Among the 150 participants included in this study, 61 individuals (40.67 %) received FJS. In the Exposed group, the median age was 69.0 (63.0, 76.0), while in the Control group, it was 67.0 (60.0, 75.0). The Exposed group exhibited smoking and drinking rates of 49.2 % and 27.9 %, respectively. Predominantly, the pathological type was adenocarcinoma (72.1 %), with 24 patients (39.3 %) harboring EGFR mutations. Additional characteristics are detailed in Table 1. Upon comparing the patient characteristics between the Exposed and Control groups, it was observed that levels of hemoglobin (HB) ($p = 0.018$) and platelet count (PLT) ($p = 0.044$) were higher in the Exposed group compared to the Control group.

3.2. Clinical outcome

The Exposed group had a median follow-up duration of 24.40 months (13.70, 36.20), while the Control group had a median follow-up duration of 20.10 months (8.90, 28.70) ($p = 0.014$). Cumulative mortality in the Exposed group (78.7 %) was lower than in the Control group (92.1 %) ($p = 0.017$). The objective response rates for the two groups were 21.3 % and 15.7 %, respectively ($p = 0.239$) (Table 2).

The Kaplan–Meier curve (Fig. 2) and log-rank test results showed that the cumulative death rate in the Exposed group was lower than that in the Control group ($p = 0.012$).

3.3. Overall survival

In the univariate Cox regression analysis, the Control group exhibited a 0.58-fold higher risk of mortality in contrast to the Exposed group (HR = 1.58, 95 % CI: 1.100–2.250, $p = 0.013$). Furthermore, performance status (PS), white blood cell (WBC) count, hemoglobin (HB), albumin (ALB), carcinoembryonic antigen (CEA), carbohydrate antigen 19–9 (CA19-9), cytokeratin 19 fragment 21-1 (Cyfra21-1), squamous cell carcinoma-associated antigen (SCC), and the administration of chemotherapy were all linked to a statistically

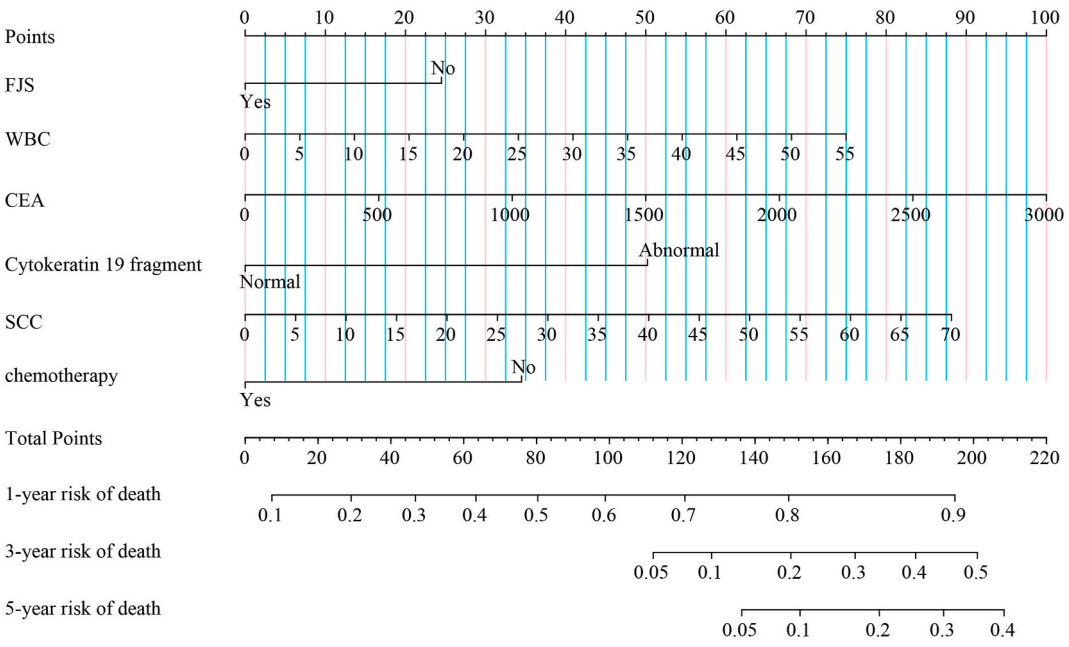

Fig. 1. Nomogram of multivariate cox regression model.

Table 2
Outcome indicator of the FJS group and control group.

Outcome indicators	FJS group (n = 61)	Control group (n = 89)	Statistics	*P*
Survival time	24.40 (13.70, 36.20)	20.10 (8.90, 28.70)	U = 2074	0.014
Survival state			$\chi^2 = 5.660$	0.017
Survival	13 (21.3 %)	7 (7.9 %)		
Mortality	48 (78.7 %)	82 (92.1 %)		
ORR			$\chi^2 = 0.764$	0.382
No	48 (78.7 %)	75 (84.3 %)		
Yes	13 (21.3 %)	14 (15.7 %)		

Note: ORR: objective remission rate.

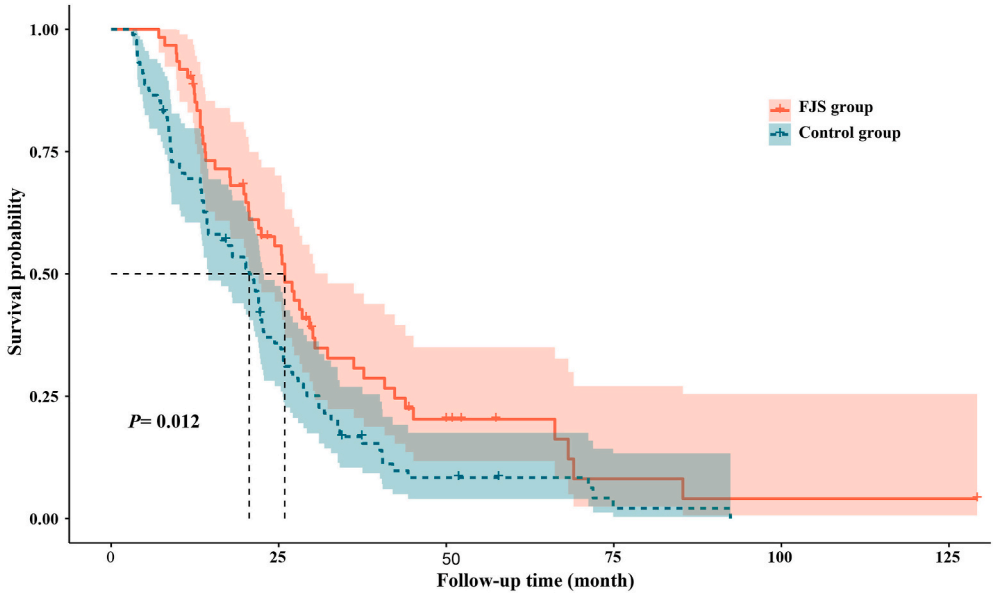

Fig. 2. K–M curves of patients in the FJS group and control group.

significant risk of mortality ($p < 0.05$) (Table 3).

In the multivariate Cox regression model, the variables that exhibited statistical significance in the univariate Cox regression model were adjusted. The stepwise regression analysis revealed that patients in the Control group had a mortality risk 1.496 times higher than that of the Exposed group (HR = 1.496, 95 % CI: 1.041–2.149, $p = 0.029$) (Table 4).

We incorporated FJS, WBC, CEA, Cyfra21-1, SCC, and chemotherapy into the multivariate Cox regression model. ROC analysis revealed that the AUCs for 1-year, 3-year, and 5-year mortality risks were 78.75 (69.13, 88.37), 72.53 (63.11, 81.96), and 80.79 (69.98, 92.61), respectively, indicating significant predictive capability (Fig. 3).

To enhance the practicality and operational ease of the model, we depicted the multifactor Cox regression model graphically as a column chart (Fig. 1). The column graph facilitates the prediction of 1-, 3-, and 5-year mortality risks for patients with tumor.

3.4. Objective remission rate

In the analysis of the ORR, based on univariate analysis, we identified sex, Cyfra21-1 abnormality, and SCC abnormality as influencing factors, with no discernible impact of FJS on ORR. Furthermore, multivariate regression analysis did not reveal any influencing factors for the objective remission rate (Table 5).

4. Discussion

As commonly acknowledged, TCM stands as a distinctive modality in cancer treatment in China, serving as both an adjuvant and alternative approach for NSCLC. Clinical investigations have demonstrated that the integration of TCM with chemotherapy or targeted therapy in the management of NSCLC contributes to the mitigation of side effects, enhancement of patient treatment tolerance, and extension of survival time [21–24].

Diverging from prior research, this study entailed an evaluation of the effectiveness of FJS in the treatment of patients with advanced NSCLC through a retrospective cohort study. The findings demonstrated that the survival time of patients in FJS group was

Table 3
Univariate cox regression model of the risk of mortality.

Variable	Coefficient	HR	95%CI		*P*
			Lower limit	Upper limit	
Sex					
Male	Reference	1.000	–	–	–
Female	−0.324	0.723	0.505	1.040	0.078
Age	0.016	1.020	0.999	1.030	0.059
Age group					
<60	Reference	1.000	–	–	–
60-69	−0.220	0.802	0.506	1.270	0.350
70-79	−0.055	0.946	0.576	1.560	0.828
≥80	0.414	1.510	0.876	2.610	0.137
Smoking history					
No	Reference	1.000	–	–	–
Yes	0.276	1.320	0.932	1.860	0.118
Drinking history					
No	Reference	1.000	–	–	–
Yes	0.057	1.060	0.717	1.560	0.775
TNM					
III	Reference	1.000	–	–	–
IV	0.12	1.130	0.656	1.940	0.663
Pathological pattern					
Squamous	Reference	1.000	–	–	–
Adenocarcinoma	−0.063	0.939	0.619	1.420	0.767
EGFR mutations					
No	Reference	1.000	–	–	–
Yes	−0.261	0.770	0.543	1.090	0.144
PS	0.276	1.320	1.090	1.600	0.005
WBC	0.025	1.030	1.000	1.050	0.027
HB	−0.009	0.991	0.983	0.999	0.035
PLT	0.0006	1.006	0.999	1	0.476
ALT	−0.001	0.999	0.992	1.010	0.778
AST	−0.001	0.999	0.992	1.010	0.718
ALB	−0.051	0.951	0.920	0.982	0.002
TG	0.022	1.020	0.779	1.34	0.873
TCHO	−0.086	0.918	0.790	1.07	0.265
CEA	0.0006	1.0006	1.000	1.001	0.003
CEA group					
Normal	Reference	1.000	–	–	–
Abnormal	0.356	1.430	0.958	2.130	0.080
CA19-9	0.0001	1.0001	1.000	1	0.008
CA19-9 group					
Normal	Reference	1.000	–	–	–
Abnormal	0.272	1.310	0.918	1.880	0.137
Cyfra21-1	0.012	1.010	1.010	1.020	<0.001
Cyfra21-1 group					
Normal	Reference	1.000	–	–	–
Abnormal	0.846	2.330	1.430	3.790	<0.001
SCC	0.030	1.030	1.010	1.050	0.002
SCC group					
Normal	Reference	1.000	–	–	–
Abnormal	0.121	1.130	0.795	1.600	0.499
Chemotherapy					
No	Reference	1.000	–	–	–
Yes	−0.464	0.629	0.440	0.900	0.011
Radiotherapy					
No	Reference	1.000	–	–	–
Yes	−0.033	0.967	0.675	1.39	0.856
Targeted therapy					
No	Reference	1.000	–	–	–
Yes	−0.207	0.813	0.574	1.15	0.244
Immunotherapy					
No	Reference	1.000	–	–	–
Yes	−0.471	0.624	0.344	1.13	0.121
FJS					
Yes	Reference	1.000	–	–	–
No	0.455	1.58	1.100	2.250	0.013

Table 4
Effect of the FJS on the risk of mortality of patients.

Variable	Coefficient	HR (95%CI)	z	*P*
FJS				
Yes	Reference	1.000	–	–
No	0.403	1.496 (1.041–2.149)	2.179	0.029
WBC	0.022	1.023 (0.995–1.052)	1.574	0.116
CEA	0.0005	1.0005 (1.0001–1.0010)	2.265	0.024
Cyfra21-1				
Normal	Reference	1.000	–	–
Abnormal	0.826	2.284 (1.386–3.763)	3.240	0.001
SCC	0.021	1.021 (1.0002–1.042)	1.983	0.047
Chemotherapy				
No	Reference	1.000	–	–
Yes	−0.567	0.567 (0.392–0.820)	−3.012	0.003

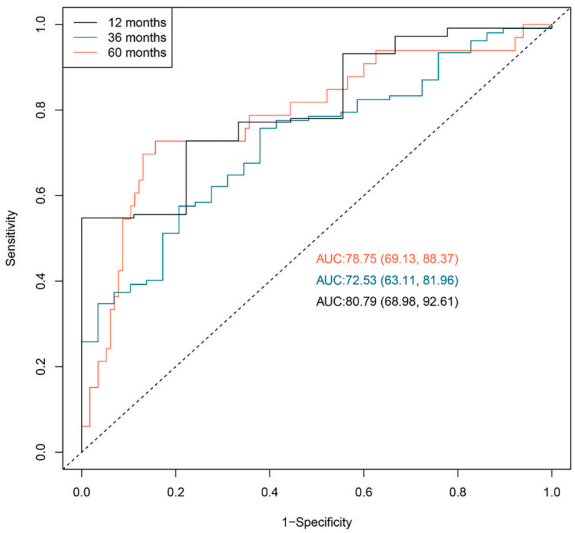

Fig. 3. ROC analysis of multivariate cox regression model.

extended compared to the control group. Despite no notable difference in the ORR between the two groups, suggesting that FJS does not impact patient survival by reducing tumor size, TCM emerges as a pivotal player in advanced tumor treatment, serving as a "healer" with distinct advantages. TCM stands as a crucial approach for prolonging survival and enhancing the quality of life for patients facing advanced tumors. Ongoing research continues to explore TCM's role in extending survival and improving patient well-being, aligning with the conclusions drawn from this study.

Our findings also affirm the efficacy of the "coexistence of humans and tumors" treatment model for advanced tumors with TCM. The notion of "survival with tumor" is a pivotal concept in the management of advanced malignant tumors, embodying the holistic principle of the unity of nature and human [25,26]. Pioneered by TCM master Zhou [27,28], the academic concept of "survival with tumor" was initially introduced in his "Experimental Collection of Cancer Therapeutics." From the perspective of TCM, tumors are perceived as manifestations of essence deficiency and symptom excess. For instance, the approach to treating advanced NSCLC previously showcased a limited interpretation of "survival with tumor." [29].

The clinical treatment objective of "survival with tumor" in TCM is consistent with the assessment criteria for solid tumor efficacy outlined by the World Health Organization, even in cases where clinical CR does not meet the standard of tumor-free status. For instance, Professor Guo Lihua demonstrated the treatment of lung adenocarcinoma patients solely with TCM over a 4-year clinical period, achieving SD [30,31]. The "Fu Zheng Jie Du Qu Yu" therapy for advanced NSCLC, as elucidated by Professor Jiang [32], exhibits precise therapeutic efficacy in clinical practice, effectively prolonging patient survival. This approach enables individuals with advanced NSCLC to lead extended and more comfortable lives alongside the presence of the tumor. The primary mechanisms involve tumor stabilization and symptom improvement, aligning with the objective of "survival with tumor" and consequently extending patient survival duration.

Collectively, FJS, classified under TCM, exhibits low toxicity, cost-effectiveness, and the ability to extend the survival duration in patients with advanced NSCLC. Being a TCM formulation, ongoing investigations are underway to assess its safety, affordability, and potential impact on the survival outcomes for individuals with advanced NSCLC. This exploration may broaden the array of treatment alternatives available for those facing advanced NSCLC. While this study offers initial insights into the role of TCM formulations in

Table 5
Influencing factors of objective mitigation rate.

Variable	Univariate analysis		Multivariate analysis	
	OR (95%CI)	*P*	OR (95%CI)	*P*
Sex				
Male	1.000	–		
Female	3.133(1.33–7.377)	0.0090	2.14(0.837–5.475)	0.1121
Age	0.972(0.936–1.011)	0.1577		
Age group				
<60	1.000	–		
60-69	0.555(0.195–1.58)	0.2704		
70-79	0.421(0.125–1.412)	0.1611		
≥80	0.555(0.149–2.072)	0.3815		
Smoking history				
No	1.000	–		
Yes	0.598(0.254–1.409)	0.2396		
Drinking history				
No	1.000	–		
Yes	1.745(0.724–4.212)	0.2150		
TNM				
III	1.000	–		
IV	1.283(0.348–4.731)	0.7082		
Pathological pattern				
Squamous	1.000	–		
Adenocarcinoma	1.483(0.517–4.249)	0.4635		
EGFR mutations				
No	1.000	–		
Yes	1.355(0.587–3.129)	0.4757		
PS	0.801(0.513–1.251)	0.3298		
WBC	1.016(0.959–1.078)	0.5825		
HB	1.001(0.983–1.019)	0.8986		
PLT	1.001(0.997–1.005)	0.5704		
ALT	1.012(0.998–1.027)	0.0991		
AST	1.019(0.999–1.039)	0.0575		
ALB	1.02(0.94–1.108)	0.6249		
TG	1.212(0.673–2.182)	0.5227		
TCHO	1.221(0.919–1.621)	0.1679		
CEA	1(0.999–1.001)	0.5860		
CEA group				
Normal	1.000	–		
Abnormal	1.82(0.64–5.181)	0.2614		
CA199	1(1–1)	0.5643		
CA199 group				
Normal	1.000	–		
Abnormal	1.66(0.711–3.875)	0.2413		
Cyfra21-1	0.992(0.974–1.009)	0.3586		
Cyfra21-1 group				
Normal	1.000	–	1.000	–
Abnormal	0.33(0.132–0.825)	0.0177	0.429(0.163–1.128)	0.0862
SCC	0.963(0.877–1.057)	0.4288		
SCC group				
Normal	1.000	–	1.000	–
Abnormal	0.365(0.138–0.968)	0.0427	0.51(0.179–1.451)	0.2071
Chemotherapy				
No	1.000	–		
Yes	1.74(0.707–4.279)	0.2281		
Radiotherapy				
No	1.000	–		
Yes	0.73(0.296–1.802)	0.4946		
Targeted therapy				
No	1.000	–		
Yes	1.968(0.82–4.719)	0.1294		
Immunotherapy				
No	1.000	–		
Yes	1.923(0.622–5.944)	0.2560		
FJS				
Yes	1.000	–		
No	0.689(0.298–1.592)	0.3837		

enhancing the survival prospects of advanced NSCLC patients, its retrospective nature imposes certain limitations. Primarily, retrospective studies rely on existing medical records, introducing the possibility of incomplete data and record biases, which could impact result accuracy. Ensuring uniformity in the treatment received across all patients is also challenging in retrospective analyses. The study lacks a comparison with standardized Western medical treatments, an essential aspect for substantiating the efficacy of the TCM formulation FJS. Furthermore, as a single-center study, the sample size may be restricted, and the process of patient selection could introduce regional and demographic biases, consequently limiting the generalizability of the findings. Additionally, while the primary outcome measures displayed positive trends, the secondary outcome indicator—ORR—did not achieve statistical significance, suggesting that the impact of the TCM formulation on disease amelioration may have limitations. This observation implies that the medication may have minimal direct effects on tumor reduction and could potentially exert its influence on enhancing the quality of life of patients through other biological mechanisms.

5. Conclusions

Despite its constraints, this study provides substantial insights into the utilization of TCM within the field of oncology. The results align with the Chinese medicine principle of "survival with tumor," emphasizing not only disease remission but also the augmentation of life quality and survival duration. This convergence with contemporary cancer treatment trends underscores the significance of holistic well-being and integrative care for patients.

In upcoming research endeavors, we intend to initiate multicentric, prospective clinical trials to provide a more precise evaluation of the effectiveness of FJS in the treatment of advanced NSCLC. This approach will enable an assessment of the efficacy and safety of FJS across a broader and more diverse patient population. Furthermore, our objectives include delving into the potential mechanisms through which FJS influences tumor biology, paving the way for innovative therapeutic strategies for NSCLC. Future studies will also prioritize the assessment of quality-of-life indicators and the optimization of patient well-being through personalized treatment approaches, maintaining an equitable and objective perspective throughout the research. Nevertheless, this study is constrained by limitations stemming from time and staffing, including relatively modest sample sizes and the inclusion of patients from a single center. Subsequent prospective cohort studies encompassing multiple centers and larger sample sizes are imperative to comprehensively assess the efficacy of the FJS in the treatment of advanced NSCLC and to furnish supplementary data for randomized controlled trials. Despite the notable clinical efficacy demonstrated by FJS, its mechanism of action against lung cancer remains unclear, representing a shared challenge within the TCM approach to treating malignant tumors.

Ethics approval and consent to participate

This study was conducted with approval from the Ethics Committee of The Second Affiliated Hospital of Zhejiang Chinese Medical University (Approval Number: 2022research101-01). This study was conducted in accordance with the declaration of Helsinki. Written informed consent was obtained from all participants.

Consent for publication

Not applicable.

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Availability of data and materials

The datasets used and/or analysed during the current study available from the corresponding author on reasonable request.

CRediT authorship contribution statement

Zhen Yan: Writing – original draft, Software, Formal analysis, Data curation. **Wen-Cang Gao:** Writing – review & editing, Validation, Formal analysis. **Xiao-Xiao Wang:** Writing – original draft, Software, Formal analysis. **Hong-Quan Xu:** Investigation, Formal analysis, Data curation. **Qian Li:** Writing – original draft, Software, Formal analysis. **Jian-Xiang Chen:** Writing – review & editing, Project administration, Conceptualization. **De-Xiang Pang:** Writing – review & editing, Visualization, Formal analysis. **Tian Xie:** Writing – review & editing, Resources, Conceptualization.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Abbreviations:

TNM	tumor-node-metastasis
PS	performance status
NRS	numeric rating scales
WBC	white blood cell
NE%	Percentage of neutrophils
NEUT	Neutrophil absolute
HB	haemoglobin
PLT	platelet count
ALT	alanine transaminase
AST	glutamic oxalic transaminase
ALB	albumin
TBIL	total bilirubin
TG	triglyceride
TCHO	total cholesterol
CEA	carcinoembryonic antigen
AFP	alpha fetoprotein
CA19-9	carbohydrate antigen 19-9
Cyfra21-1	cytokeratin 19 fragment 21-1
SCC	squamous cell carcinoma associated antigen

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