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LETTER TO THE EDITOR Open Access

Is adjuvant immunotherapy necessary after neoadjuvant chemoimmunotherapy in NSCLC? A propensity score matching analysis

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To the editor

IMpower010 and PEARLS/KEYNOTE-091 found that adjuvant immunotherapy improves the prognosis of patients with non-small cell lung cancer undergoing radical resection [1, 2]. However, whether the addition of adjuvant immunotherapy after neoadjuvant immunotherapy improves patient prognosis remains controversial.

Methods

All the study procedures were conducted in accordance with the Declaration of Helsinki, and were approved by the Ethics Committee of Zhejiang Cancer Hospital (No. IRB–2024–328). The requirement of individual consent for this retrospective analysis was waived.

Patients treated at Zhejiang Cancer Hospital between January 2021 and December 2023 were retrospectively reviewed. Patients in the adjuvant group received adjuvant immunotherapy (every 3 weeks) lasting six months. The final follow-up date for the patients included in the study occurred in August 2024. The primary endpoint was event-free survival (EFS), defined as the interval from the initiation of neoadjuvant chemo-immunotherapy to the date of disease progression that precluded definitive surgery, local or distant recurrence, occurrence of a second primary cancer, or death from any cause, whichever occurred first. The 2-year EFS rates was estimated using the Kaplan–Meier method. To minimize the effect of confounders on treatment effects, we performed propensity score matching (PSM) on the data using the "MatchIt" package in the R. Supplement 1 provides additional details about the methods.

Results

Before matching, no significant differences were observed between the two groups regarding gender, smoking history, BMI, pre-CT tumor size, clinical stage, tumor location, histological type, or rates of pathologic complete response. However, patients with age≥65 ($P<0.001$) and fewer cycles of neoadjuvant immunotherapy ($P=0.004$) were more prevalent in the non-adjuvant group (Table 1). After 1:1 matching for the covariates, 54 patients were included in each group. Before PSM, adjuvant group exhibited the higher 2-year EFS rates compared to non-adjuvant group [84.70% (95% CI 70.20%-100.00%) vs. 74.58% (95% CI 65.82%-84.49%); Fig. 1A]. However, this result lacks statistical significance ($P=0.130$). In the matching cohort, the previously observed EFS advantage in the adjuvant group did not persist [2-year EFS rates: 84.70% (95% CI 70.20%-100.00%) vs. 80.82% (95% CI 68.92%-94.76%); $P=0.400$; Fig. 1B] in the adjuvant and non-adjuvant groups, respectively.

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Table 1 Comparison of the clinical and pathological characteristics between non-adjuvant and adjuvant groups before and after PSM

Characteristics	Before PSM			After PSM		
	Non-adjuvant	Adjuvant	P	Non-adjuvant	Adjuvant	P
Age			< 0.001			1.000
< 65	55 (37.2%)	36 (66.7%)		35 (64.8%)	36 (66.7%)	
≥ 65	93 (62.8%)	18 (33.3%)		19 (35.2%)	18 (33.3%)	
Gender			0.401			1.000
Female	11 (7.43%)	6 (11.1%)		5 (9.26%)	6 (11.1%)	
Male	137 (92.6%)	48 (88.9%)		49 (90.7%)	48 (88.9%)	
BMI			0.924			1.000
Normal weight	104 (70.3%)	39 (72.2%)		39 (72.2%)	39 (72.2%)	
Under/Over weight	44 (29.7%)	15 (27.8%)		15 (27.8%)	15 (27.8%)	
Smoking History			0.087			0.540
Never smoker	35 (23.6%)	20 (37.0%)		16 (29.6%)	20 (37.0%)	
Smoker or ex-smoker	113 (76.4%)	34 (63.0%)		38 (70.4%)	34 (63.0%)	
Pre-CT Tumor Size			0.851			1.000
< 50	89 (60.1%)	31 (57.4%)		30 (55.6%)	31 (57.4%)	
≥ 50	59 (39.9%)	23 (42.6%)		24 (44.4%)	23 (42.6%)	
Clinical Stage			0.652			0.837
I	9 (6.08%)	5 (9.26%)		4 (7.41%)	5 (9.26%)	
II	52 (35.1%)	20 (37.0%)		18 (33.3%)	20 (37.0%)	
III	87 (58.8%)	29 (53.7%)		32 (59.3%)	29 (53.7%)	
Tumor Location			0.935			0.984
LLL	27 (18.2%)	12 (22.2%)		10 (18.5%)	12 (22.2%)	
LUL	38 (25.7%)	13 (24.1%)		13 (24.1%)	13 (24.1%)	
RLL	38 (25.7%)	12 (22.2%)		12 (22.2%)	12 (22.2%)	
RML	5 (3.38%)	1 (1.85%)		2 (3.70%)	1 (1.85%)	
RUL	40 (27.0%)	16 (29.6%)		17 (31.5%)	16 (29.6%)	
Histological Type			0.384			0.804
LUAD	35 (23.6%)	9 (16.7%)		11 (20.4%)	9 (16.7%)	
LUSC	113 (76.4%)	45 (83.3%)		43 (79.6%)	45 (83.3%)	
pCR			1.000			0.685
No	94 (63.5%)	34 (63.0%)		37 (68.5%)	34 (63.0%)	
Yes	54 (36.5%)	20 (37.0%)		17 (31.5%)	20 (37.0%)	
Neoadjuvant Cycles			0.004			0.711
2	97 (65.5%)	23 (42.6%)		23 (42.6%)	23 (42.6%)	
3	30 (20.3%)	23 (42.6%)		20 (37.0%)	23 (42.6%)	
4	21 (14.2%)	8 (14.8%)		11 (20.4%)	8 (14.8%)	

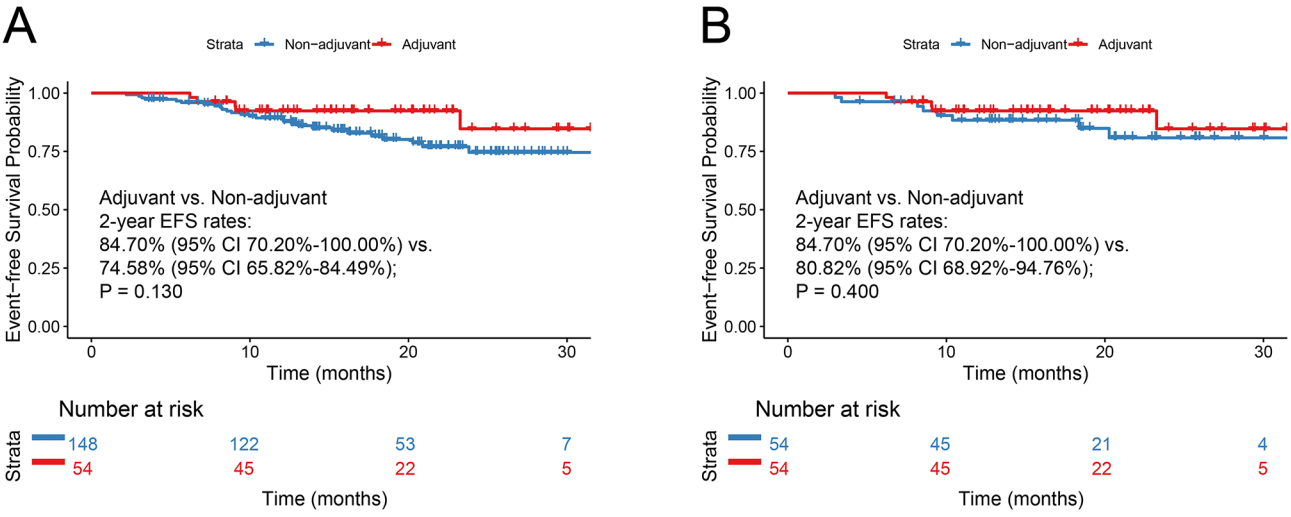

Fig. 1 Kaplan-Meier survival curves comparing the non-adjuvant and adjuvant groups before and after PSM

Discussion

Our study found that adjuvant immunotherapy did not improve patient survival outcomes. Nonetheless, we believe there is a need for more in-depth studies to find out which patient groups would benefit from additional immunotherapy.

The limitations of this study are that it was conducted in only one center. Second, the follow-up period was short. Third, the retrospective design of this study may introduce biases such as selection bias and information bias. To address these biases, future studies should consider adopting a prospective study design and incorporating larger multicenter cohorts to improve the generalizability and reliability of the findings.

Abbreviations

EFS Event-free survival
PSM Propensity score matching

Supplementary Information

The online version contains supplementary material available at https://doi.org/10.1186/s12967-024-05727-1.

Supplementary Material 1

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Not applicable.

Author contributions

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Data availability

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

Declarations

Ethics approval and consent to participate

All the study procedures were conducted in accordance with the Declaration of Helsinki, and were approved by the Ethics Committee of Zhejiang Cancer Hospital (No. IRB–2024–328). The requirement of individual consent for this retrospective analysis was waived.

Consent for publication

Not applicable.

Competing interests

The authors declare that they have no competing interests.

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