Research Square

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Do Older Patients with Stage IB Non-Small-Cell Lung Cancer Obtain Survival Benefit from Surgery? A Propensity Score Matching Study Based on the SEER Database

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Research

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Abstract

Background: Although surgery is the preferred treatment method for early-stage non-small-cell lung cancer (NSCLC), more than a third of older patients with stage IB NSCLC didn't receive surgical treatment.

Methods: Data of patients with NSCLC was downloaded from the SEER (Surveillance, Epidemiology, and End Results) database, converted from the 7th edition staging to those of the 8th edition staging, and then screened out older patients (aged ≥65 years at diagnosis) with stage IB NSCLC. The propensity score matching (PSM) method was were balanced the distribution proportions of clinical characteristics between the surgery and no surgery groups.

Results: After 1:1 propensity score matching, the distribution proportions of clinical characteristics were balanced between the surgery and no surgery groups ($P > 0.05$, all). The overall survival and disease-specific survival of patients in the surgery group were significantly better than those in the no-surgery group ($P < 0.001$, both). Furthermore, subgroup analysis showed that receiving surgery was a protective factor for overall survival and disease-specific survival of patients in all clinical character-related subgroups. Ultimately, univariate and multivariate Cox regression analyses showed that gender, tumor size, tumor grade, and tumor classification were independent prognostic factors for overall survival and disease-specific survival in patients undergoing surgery.

Conclusions: Older patients with Stage IB NSCLC should opt for surgery without hesitation. This study is expected to provide strong evidence-based medical evidence for the surgical treatment of these patients.

Introduction

Lung cancer is the most common malignancy worldwide causing the greatest number of tumor-related deaths. Pathologically, lung cancer is divided into small cell lung cancer (SCLC) and non-small cell lung cancer (NSCLC), of which NSCLC accounts for 85% of cases [1, 2]. Similar to other malignancies, the proportion of patients with NSCLC who are older (aged 65 years or older) has increased in recent years due to the increasing aging of the global population [3, 4]. Compared with younger patients, older patients with NSCLC often have poor prognoses because of poor health or complications, such as chronic obstructive pulmonary disease (COPD) and stroke [5, 6]. Therefore, identifying the optimal treatment for older patients with early-stage NSCLC is challenging [7, 8]. Currently, surgical resection remains the preferred therapy for early-stage NSCLC, as recommended by the National Comprehensive Cancer Network and American Society of Clinical Oncology guidelines. According to the guidelines, surgery is particularly appropriate for patients with early-stage NSCLC who do not have surgical contraindications [9, 10]. However, older patients with NSCLC often have other complex underlying diseases. There is also a lack of medical evidence to conclude that surgery is significantly better than conservative treatment in terms of long-term survival benefits. Therefore, about a quarter of older patients with early-stage NSCLC do not choose surgical therapy clinically [7].

The Surveillance, Epidemiology, and End Results (SEER) database is currently the largest oncology clinical database in the world and an ideal data pool for global oncology research [11]. However, previous studies based on the SEER database had some limitations, such as inconsistent criteria for tumor staging and bias of baseline characteristics of patients between specific groups [12, 13]. These limitations affected the comparative efficiency of the retrospective studies. In this study, data for older patients with NSCLC were extracted from the SEER database and all these patients were classified as stage IB according to the criteria of the latest 8th edition American Joint Committee on Cancer (AJCC) NSCLC guidelines. In addition, the biases of the clinical characteristics between patients with or without surgery were eliminated by propensity score matching (PSM) to explore the influence of surgery on the prognosis of these patients and the possible factors that could affect the surgical outcome.

Materials And Methods

Data Source

The representative population of patients with NSCLC was identified from the SEER Program (www.seer.cancer.gov) SEER*Stat Database: Incidence - SEER 18 Regs Custom Data (with additional treatment fields), Nov 2018 Sub (1975-2016 varying). The screening process of the patients is shown in **Figure 1**. The inclusion criteria included: (1) primary site: lung and bronchus; (2) histology/behavior, malignant: NSCLC (encoding: 8004, 8012, 8013, 8014, 8022, 8031-8035, 8046, 8050, 8052, 8071-8075, 8082-8084, 8123, 8200, 8240, 8244, 8245, 8249, 8250-8255, 8260, 8290, 8310, 8323, 8333, 8430, 8480, 8481, 8490, 8507, 8550, 8560, 8562, 8570, 8571, 8574, 8576, 8980); (3) diagnostic confirmation: positive histology; (4) diagnosis between 2010 and 2016; and (5) complete data of survival were available and there were more than 0 days of survival. The exclusion criteria were as follows: (1) not IB stage NSCLC (AJCC 8th); (2) aged < 65 years; (3) the type of reporting source: autopsy only or death certificate only; and (4) unknown survival months. We extracted the demographic and cancer-related information of each patient from the SEER database. It included age, race, gender, marital status, tumor size, T, N, and M stages (AJCC 7th edition), stage group (AJCC 7th edition), tumor CS (Collaborative Stage Manual) extension, grade, laterality, cause-specific death classification, survival months and vital status, surgery, radiotherapy, and chemotherapy, among others. We then converted the TNM stages based on the AJCC 7th edition to those of the 8th edition for each patient by using tumor size, tumor CS extension, and 7th edition N/M stages. The primary clinical endpoints were overall survival (OS) and disease-specific survival (DSS).

Ethical Statement

The authors are accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. The study was conducted in accordance with the Declaration of Helsinki (as revised in 2013). The study was approved by the Clinical Research Ethics Committee of the Affiliated Hospital of Nantong University (Jiangsu, China; approval no. 2017-K025) and individual consent for this retrospective analysis was waived.

Method of Data Conversion for Stage IB NSCLC

According to the 7th and 8th AJCC Staging Manual, stage IB NSCLC is defined as T stage = T2a, N stage = N0, and M stage = M0. Based on the comparison of the two AJCC cancer staging manuals, we found that the difference in the definition of stage IB only was the difference in the T2a stage. Between the two editions, T2a was defined differently as follows: T2a stage with tumor sizes of 4–5 cm in the 7th edition was divided into T2b in the 8th edition; in the 7th edition, tumor size < 4 cm and tumor infiltrated the main bronchus with a distance < 2 cm to the carina, but not infiltrating the carina, was classified as T3 stage. However, those were divided into T2a in the 8th edition, with the T stages of patients with tumor size < 4 cm and having whole atelectasis/pneumonia converted from T3 in the 7th edition to T2a in the 8th edition. Furthermore, based on the above principles, we converted the tumor stage of the cases from the AJCC 7th edition to those of the 8th edition.

Statistical Analysis

The baseline characteristics of patients in the surgery and no surgery groups are described using conventional statistics, such as means ± standard deviation (SD), medians, frequencies, and percentages. The baseline demographic data for the two groups were compared using the Student's t-test or $\chi 2$ test and Fisher's exact test before and after PSM as deemed appropriate. PSM was performed between the two groups to reduce potential bias and possible confounding interference. Patients who were alive on December 31, 2016, were censored in the OS analysis, and patients who died from diseases other than NSCLC were excluded from the DSS analysis. The Kaplan-Meier (KM) method was applied for survival curve plotting and the log-rank test was applied to determine the differences between the two groups. We used Cox proportional hazards regression analyses with both univariate and multivariate Cox regression analyses. Moreover, the risk factors assessed using multivariate Cox proportional hazards regression models were also used for subgroup analyses. In addition, a forest plot of hazard ratios was constructed from multivariate Cox analysis in Cohort 2.

Results

Baseline Clinical Characteristics

A total of 6070 patients aged ≥65 years who had been diagnosed with stage IB NSCLC were included in our study (cohort 1). Univariate Cox analysis showed that the OS of the patients was related to race, gender, marital status, tumor size, pleural invasion, tumor grade, tumor classification, surgery, lymphadenectomy, and radiation (**Figure S1A**). Further multivariate Cox analysis showed that race, gender, marital status, tumor size, tumor classification, and surgery were the independent predictive factors for OS (**Figure S1B)**. Analogously, the DSS of the patients was associated with gender, marital status, tumor size, pleural invasion, tumor grade, tumor classification, surgery, and lymphadenectomy in Univariate Cox analysis (**Figure S1C**). Gender, tumor size, tumor classification, surgery, and lymphadenectomy were the independent predictive factors for DSS (**Figure S1D)**. Remarkably, surgical treatment was the most significant protective factor for both OS and DSS.

The K-M curves showed that the OS and DSS of patients aged ≥65 years with stage IB NSCLS who underwent surgery were significantly better than those who did not undergo surgery ($P < 0.001$, both; **Figure S2**). Of the population surveyed, about 71.50% of patients (4340 patients) underwent surgical resection. The baseline clinical characteristics of the patients are shown in **Table 1**. The results showed that the distribution frequencies of some general characteristics, such as race ($P < 0.001$), gender ($P = 0.003$), and marital status ($P < 0.001$) were unbalanced between the surgery and no surgery groups. In terms of tumor pathological characteristics, the surgery group was associated with larger tumor size ($P < 0.001$), location of the right lung ($P < 0.001$), positive pleural invasion ($P < 0.001$), more classification of adenocarcinoma ($P < 0.001$), and moderate tumor grade ($P < 0.001$). In terms of therapy, the patients in the surgery group were more likely to have received lymphadenectomy ($P < 0.001$) and not received radiotherapy ($P < 0.001$). However, chemotherapy ($P = 0.309$) was not significantly different between the two groups. Given the unbalanced distribution of these indicators between the surgical and non-surgical groups, the interference from these factors needs to be minimized to determine the significance of surgery for prognosis.

Survival analysis and multivariate Cox analysis after Propensity Score Matching

After 1:1 PSM of 11 clinical characteristics, a total of 361 pairs of patients were included in the surgery group and the no surgery group (cohort 2), respectively. The distribution of baseline characteristics was almost balanced between the two groups (P > 0.1) (**Table 2**).

After PSM, univariate Cox analysis showed that gender ($P = 0.005$), tumor classification ($P = 0.012$), and surgery ($P < 0.001$) were the prognostic factors for OS, whereas only surgery ($P < 0.001$) was the prognostic factor for DSS (**Figure 2A** and **2C**). The results of subsequent multivariate analysis showed that gender ($P = 0.007$), tumor classification ($P = 0.001$), surgery ($P < 0.001$), and radiation ($P = 0.044$) for OS; as well as tumor classification ($P = 0.043$) and surgery ($P < 0.001$) for DSS were the independent predictive factors (**Figure 2B** and **2D**).

Kaplan-Meier survival analysis after PSM showed that the OS of the surgery group was significantly better than that of the no-surgery group ($P < 0.001$). The median OS time of the surgery group was 61 months, which was significantly longer than the median OS time of the no-surgery group (22 months) (**Figure 3A**). Similar to the OS, the DSS of patients in the surgery group was also significantly better than that of patients in the no surgery group ($P < 0.001$), with the median DSS being 71 months in the surgery group and 29 months in the no surgery group (**Figure 3B**).

Subgroup Analysis of OS and DSS in Subgroups of Clinical Characteristics

To better compare the protective effect of surgical factors on prognosis after PSM and to further reduce the interference of other factors on the outcome, subgroup analyses of all clinical characteristics were performed. The OS subgroup analysis showed that surgery was a protective prognostic factor for OS in almost all subgroups of clinical characteristics (**Figure 4**). In some subgroups of clinical characteristics, such as the Black subgroup in the race, the large cell carcinoma subgroup in tumor classification, and the unknown subgroup in lymphadenectomy, the difference in OS between surgery and no surgery patients was statistically insignificant because of the small number of cases. The DSS subgroup analysis also showed that surgical treatment was a protective factor for DSS survival in all subgroups with a patient sample size > 100 (**Figure 5**).

Prognostic Factors of Patients in the Surgery Group

To further investigate the prognostic factors of older patients with IB stage NSCLC undergoing surgery, we screened the clinical characteristics of these patients in the surgery group using multivariate Cox analysis. The results showed that gender (male vs. female), tumor size (larger tumor size), tumor grade (lower grade), and tumor type (other pathological types vs. adenocarcinoma) were the statistically negative influencing factors for OS and DSS in the surgery group. In addition, race (other ethnicity vs. White) was also a negative prognostic factor for OS (**Figure 6A**), but not for DSS (**Figure 6B**).

Discussion

In this study, based on confirming that surgical treatment was the most significant protective factor for the older patients with stage IB NSCLC, we performed propensity score matching to eliminate the influence of other clinical factors. After 1:1 propensity score matching, the distribution proportions of clinical characteristics were balanced between the surgery and no-surgery groups. The overall survival and disease-specific survival of patients in the surgery group were significantly better than those in the no-surgery group. Receiving surgery was a protective factor for overall survival and disease-specific survival of patients in all clinical character-related subgroups. Therefore, surgical treatment, as an independent and the most significant protective factor, significantly improves the survival time of the older patients with stage IB NSCLC, which is expected to provide strong evidence-based medical evidence for the surgical treatment of these patients.

The SEER database is currently the largest database of tumor clinical information in the world. Research on tumors based on SEER has revealed many complex problems in tumor clinical practice [14, 15]. However, for recent studies using samples collected over a long period in the SEER database, there are many different editions of AJCC guidelines in terms of tumor stage and other indicators, which makes a comparison of results challenging [16]. Because of this, our study was the first to convert the TNM staging of all patients based on AJCC edition 7 into those of edition 8, which ensured that current study population information was in line with current treatment guidelines. Based on the latest 8th edition of the AJCC NSCLC tumor staging criteria, our study also provides credible and practical evidence-based medical evidence for the current clinical decision of treatment in older patients with IB stage NSCLC (**Figure 1**).

The increasing trend of population aging worldwide has led to an increasing proportion of older patients with NSCLC. It is estimated that the incidence of NSCLC in older patients (aged ≥ 65 years) will increase from 6% to 7% annually from 163,000 in 2010 to 271,000 in 2030 [17]. Surgeons are concerned about the increased postoperative morbidity and mortality of older patients with NSCLC compared to younger patients with better underlying health status. Therefore, it is controversial whether the clinical benefits of surgical treatment are significant for older patients even if their NSCLC is at an early stage, such as stage IB. Although there have been a few studies exploring the advantages and disadvantages of surgical treatment in older patients with early-stage NSCLC, these studies have the insufficient sample size and interference of confounding factors [18, 19]. Our results showed that there was a severely unbalanced distribution of clinicopathological characteristics between the surgical and non-surgical groups, although surgical treatment was the most significant protective factor among all the clinical factors for both OS and DSS (**Figure S1-2, Table 1**).

All cancer studies based on the SEER database are retrospective studies [20, 21]. Unlike prospective cohort studies, retrospective studies often have biases in data distribution in terms of baseline characteristics due to the lack of a prior study design [22, 23]. In many cases, these biases interfere with the comparison between groups and the accuracy of the regression model [24, 25]. To reduce the interference of general clinical information on the comparison results, we used the 1:1 PSM method to balance the distribution of characteristics. PSM is a commonly used statistical method that can enable the statistical test efficiency of a retrospective study, similar to that of a prospective randomized cohort study [26, 27]. In this study, PSM was used to match a total of 11 characteristics between older patients with IB stage NSCLC with or without surgery. Using the PSM, the OS and DSS could be compared between the two groups at a similar baseline and with more convincing results (**Table 2**). Our results showed that in a cohort of 722 older patients with stage IB NSCLC, with 1:1 PSM matching, both the OS and DSS of patients who received surgical treatment were significantly better than those who did not receive surgery (**Figure 2-3**). Subgroup analysis for all baseline characteristics showed the same results, indicating that surgery was associated with better long-term survival in all subgroups with more than 100 cases (**Figure 4-5**). These results suggest that a more aggressive treatment strategy may be possible in older patients with stage IB NSCLC, leading to better clinical outcomes in terms of survival for these patients.

In addition, our study also showed that gender, tumor size, grade, and tumor pathologic type were predictors of prognosis in older patients with stage IB cancer who underwent surgery (**Figure 6**), which is consistent with the findings of previous studies on the prognosis of NSCLC [28-31]. These results suggest that these factors should be evaluated in detail before clinical treatment, especially surgical treatment. It should be noted that race was an independent predictor of OS in surgical patients in our study and was not statistically significant in DSS. The reason for this difference is that there are differences in medical conditions, lifestyle, and other aspects between different ethnic groups in the United States because of economic factors, which affect long-term survival [32, 33]. The interference caused by these non-disease factors was corrected in the DSS analyses that specifically pointed to the causes of death in NSCLC.

However, there are some limitations to our study. First, our study was a retrospective study, which may have some inevitable bias. Even though we used some methods, such as the Cox regression model and PSM, to reduce this, these methods still failed to correct some unknown potential bias. In addition, a lot of information in our study was unavailable in the SEER database, but was closely correlated with prognosis, such as preoperative physical conditions, complications, and local recurrence times. In addition, there was no information about comorbidities, which are often seen in older patients, such as COPD, coronary artery disease, and renal dysfunction. The drug information for chemotherapy or preoperative adjuvant chemotherapy was not available in the SEER either. Because we are uncertain whether these factors had an impact on our study, the conclusions should be drawn carefully. Finally, we expect future high-quality prospective clinical studies to provide more reliable validation of our conclusions.

Conclusion

In conclusion, our study found that the long-term survival of older patients with IB NSCLC who underwent surgery was significantly better than that of patients who did not receive surgery after adjusting for clinical characteristics. Gender, tumor size, tumor grade, and tumor classification were the independent predictors of clinical outcomes in patients undergoing surgery. Therefore, after careful consideration of relevant clinical factors, a more active treatment strategy should be adopted for older patients with IB stage NSCLC.

Declarations

Data Availability Statement

The raw data supporting the conclusions of this article is free and publicly accessible in the SEER database.

Ethics Statement

The study was approved by the Clinical Research Ethics Committee of the Affiliated Hospital of Nantong University (Jiangsu, China; approval no. 2017-K025) and individual consent for this retrospective analysis was waived.

Consent for publication

All authors agree on the submission of the manuscript.

Competing interests

Each author certifies that he or she has no conflict of interest related to this work.

Author Contributions

HJ Zhang has access to all of the data in this study and takes responsibility for the integrity and accuracy of the data analyses. X Ye, Y Liu, and L Yang: study concept and design. X Ye, Y wang, and XH Cui: drafting of the manuscript. HJ Xie and Lining Song: statistical analysis. ZH Ding: study supervision. All authors read and approved the final manuscript.

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Tables

Table 1. The clinicopathologic characteristics of older patients with stage IB NSCLC before propensity score matching.

Characters	No surgery (n=1724)	Surgery (n=4311)	Total (n=6035)	P-value
Race				
White	1476 (85.6%)	3780 (87.1%)	5230 (86.7%)	
Black	182 (10.6%)	300 (7.0%)	482 (8.0%)	
Other	64 (3.7%)	251 (5.8%)	315 (5.2%)	
Unknown	2 (0.1%)	6 (0.1%)	8 (0.1%)	**< 0.001**
Gender				
Female	759 (44.0%)	2081 (48.3%)	2840 (47.1%)	
Male	965 (56.0%)	2230 (51.7%)	3216 (52.9%)	**0.003**
Marital status				
Married	786 (45.6%)	2415 (56.0%)	3201 (53.0%)	
Single	873 (50.6%)	1722 (39.9%)	2595 (43.0%)	
Unknown	65 (3.8%)	174 (4.0%)	239 (4.0%)	**< 0.001**
Tumor size (cm)				
<=1	18 (1.0%)	88 (2.0%)	106 (1.8%)	
1~2	64 (3.7%)	773 (17.9%)	837 (13.9%)	
2~3	128 (7.4%)	912 (21.2%)	1040 (17.2%)	
3~4	1347 (78.1%)	2162 (50.2%)	3509 (58.1%)	
4~5	167 (9.7%)	376 (8.7%)	543 (9.0%)	**< 0.001**
Pleural invasion				
Positive	25 (1.5%)	2142 (49.7%)	2167 (35.9%)	
Negetive	112 (6.5%)	1792 (41.6%)	1904 (31.5%)	
Unknown	1587 (92.1%)	377 (8.7%)	1964 (32.5%)	**< 0.001**
Laterality				
Left	802 (46.5%)	1800 (41.8%)	2602 (43.1%)	
Right	922 (53.5%)	2510 (58.2%)	3432 (56.9%)	
Unknown	0 (0%)	1 (0%)	1 (0%)	**0.002**
Grade				
Well	92 (5.3%)	546 (12.7%)	638 (10.6%)	

Moderately	401 (23.3%)	1907 (44.2%)	2308 (38.2%)	
Poorly	508 (29.5%)	1527 (35.4%)	2035 (33.7%)	
Undifferentiated	19 (1.1%)	75 (1.7%)	94 (1.6%)	
Unknown	704 (40.8%)	256 (6.0%)	960 (15.9%)	**< 0.001**
Classification				
Adenocarcinoma	182 (10.6%)	1576 (36.6%)	1758 (29.1%)	
Squamous carcinoma	1244 (72.2%)	2107 (48.9%)	3351 (55.5%)	
Large cell carcinoma	23 (1.3%)	117 (2.7%)	140 (2.3%)	
Other	275 (16.0%)	511 (11.9%)	786 (13.0%)	**< 0.001**
Lymphadenectomy				
No	1525 (88.5%)	2862 (66.4%)	4387 (72.7%)	
Yes	190 (11.0%)	1433 (33.2%)	1623 (26.9%)	
Unknown	9 (0.5%)	16 (0.4%)	25 (0.4%)	**< 0.001**
Radiation				
No	809 (46.9%)	2644 (61.3%)	3453 (57.2%)	
Yes	900 (52.2%)	1617 (37.5%)	2517 (41.7%)	
Unknown	15 (0.9%)	50 (1.2%)	65 (1.1%)	**< 0.001**
Chemotherapy				
No	1022 (59.3%)	2622 (60.8%)	3644 (60.4%)	
Yes	702 (40.7%)	1689 (39.2%)	2391 (39.6%)	0.282

Table 2. The clinicopathologic characteristics of older patients with stage IB NSCLC after propensity score matching.

Characters	No surgery (n=361)	Surgery (n=361)	Total (n=722)	P-value
Race				
White	311 (86.1%)	311 (86.1%)	622 (86.1%)	
Black	36 (10.0%)	35 (9.7%)	71 (9.8%)	
Other	14 (3.9%)	15 (4.2%)	29 (4.0%)	0.976
Gender				
Female	164 (45.4%)	173 (47.9%)	337 (46.7%)	
Male	197 (54.6%)	188 (52.1%)	385 (53.3%)	0.551
Marital status				
Married	163 (45.2%)	178 (49.3%)	341 (47.2%)	
Single	175 (48.5%)	164 (45.4%)	339 (47.0%)	
Unknown	23 (6.4%)	19 (5.3%)	42 (5.8%)	0.497
Tumor size (cm)				
<=1	5 (1.4%)	9 (2.5%)	14 (1.9%)	
1~2	24 (6.6%)	28 (7.8%)	52 (7.2%)	
2~3	42 (11.6%)	40 (11.1%)	82 (11.4%)	
3~4	257 (71.2%)	254 (70.4%)	511 (70.8%)	
4~5	33 (9.1%)	30 (8.3%)	63 (8.7%)	0.798
Pleural invasion				
Positive	22 (6.1%)	31 (8.6%)	53 (7.3%)	
Negative	93 (25.8%)	82 (22.7%)	175 (24.2%)	
Unknown	246 (68.1%)	248 (68.7%)	494 (68.4%)	0.328
Laterality				
Left	158 (43.8%)	167 (46.3%)	325 (45.0%)	
Right	203 (56.2%)	194 (53.7%)	397 (55.0%)	0.550
Grade				
Well	43 (11.9%)	39 (10.8%)	82 (11.4%)	
Moderately	124 (34.3%)	117 (32.4%)	241 (33.4%)	
Poorly	111 (30.7%)	120 (33.2%)	231 (32.0%)	

Undifferentiated	8 (2.2%)	8 (2.2%)	16 (2.2%)	
Unknown	75 (20.8%)	77 (21.3%)	152 (21.1%)	0.942
Classification				
Adenocarcinoma	75 (20.8%)	73 (20.2%)	148 (20.5%)	
Squamous carcinoma	213 (59.0%)	206 (57.1%)	419 (58.0%)	
Large cell carcinoma	6 (1.7%)	11 (3.0%)	17 (2.4%)	
Other	67 (28.6%)	71 (19.7%)	138 (19.1%)	0.630
Lymphadenectomy				
No	251 (69.5%)	262 (72.6%)	513 (71.1%)	
Yes	109 (30.2%)	95 (26.3%)	204 (28.3%)	
Unknown	1 (0.3%)	4 (1.1%)	5 (0.7%)	0.224
Radiation				
No	210 (58.2%)	206 (57.1%)	416 (57.6%)	
Yes	147 (40.7%)	150 (41.6%)	297 (41.1%)	
Unknown	4 (1.1%)	5 (1.4%)	9 (1.2%)	0.911
Chemotherapy				
No	231 (64.0%)	216 (59.8%)	447 (61.9%)	
Yes	130 (36.0%)	145 (40.2%)	275 (38.1%)	0.283

Figures

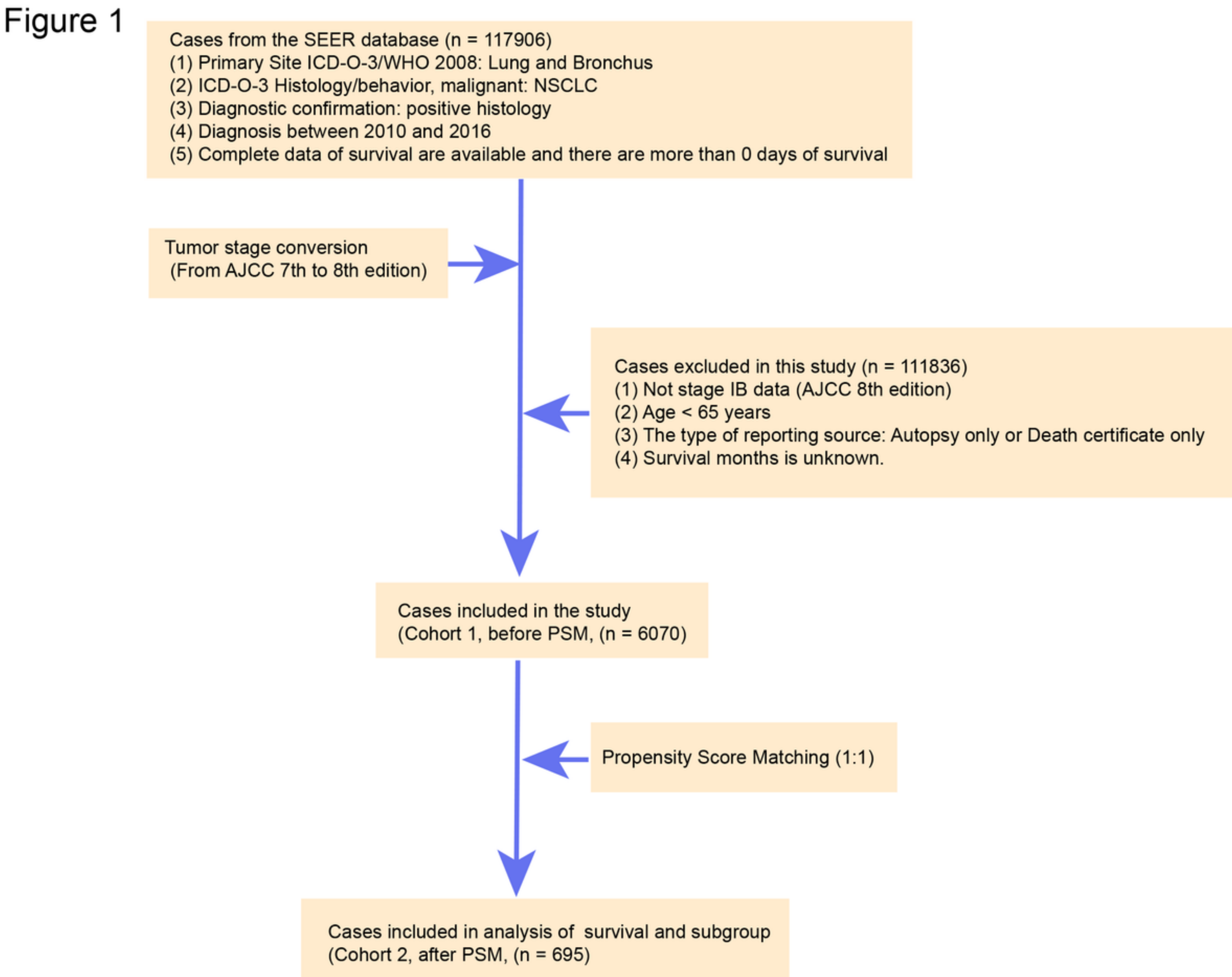

Figure 1

Flowchart for data filtration of older patients with stage IB NSCLC according to SEER dataset.

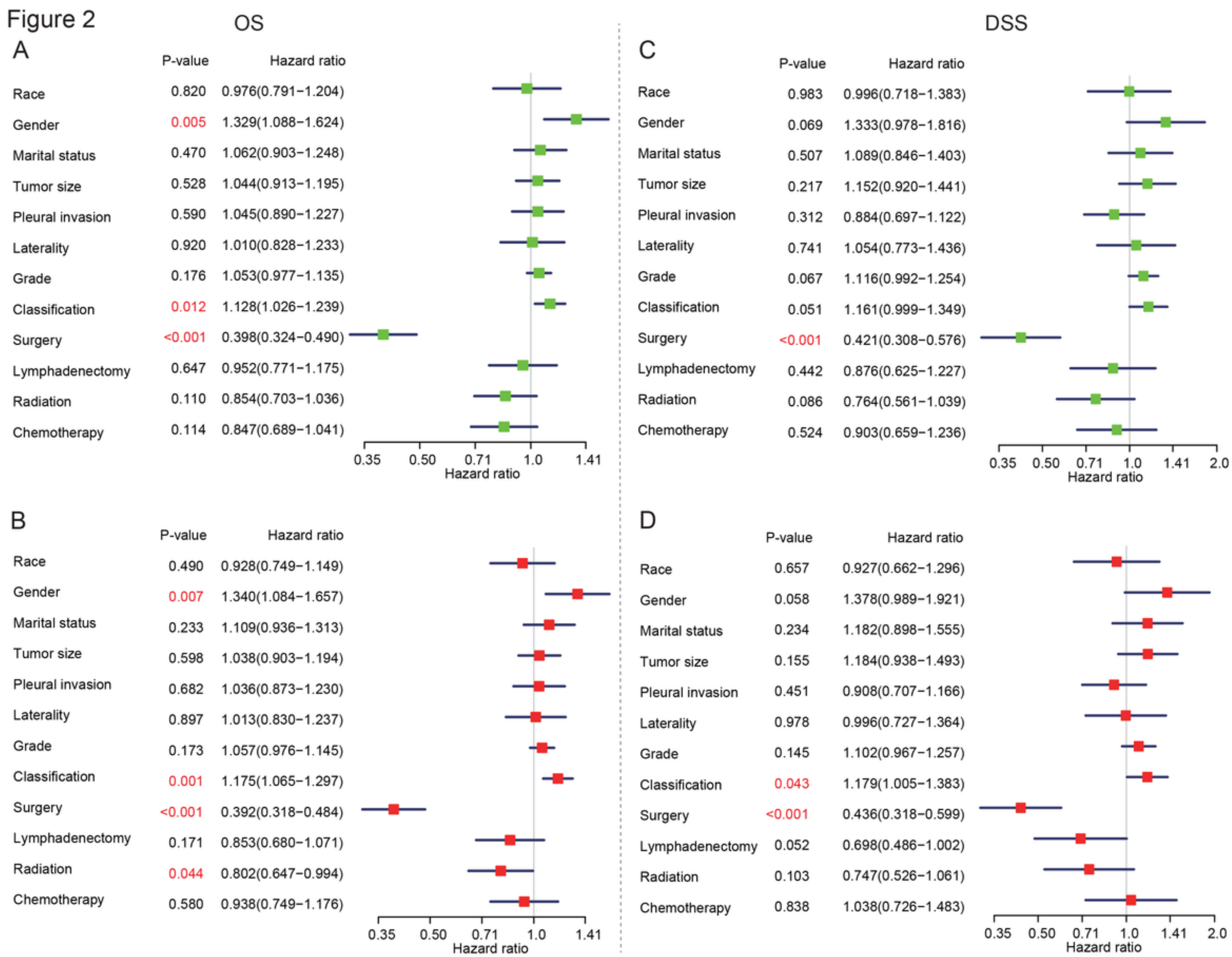

Figure 2

Cox regression analysis for overall survival and disease-specific survival of older patients with stage IB NSCLC after propensity score matching. (A) Univariate Cox analysis for overall survival (OS); (B) Multivariate Cox analysis for OS; (C) Univariate Cox analysis for disease-specific survival (DSS); (D) Multivariate Cox analysis for DSS.

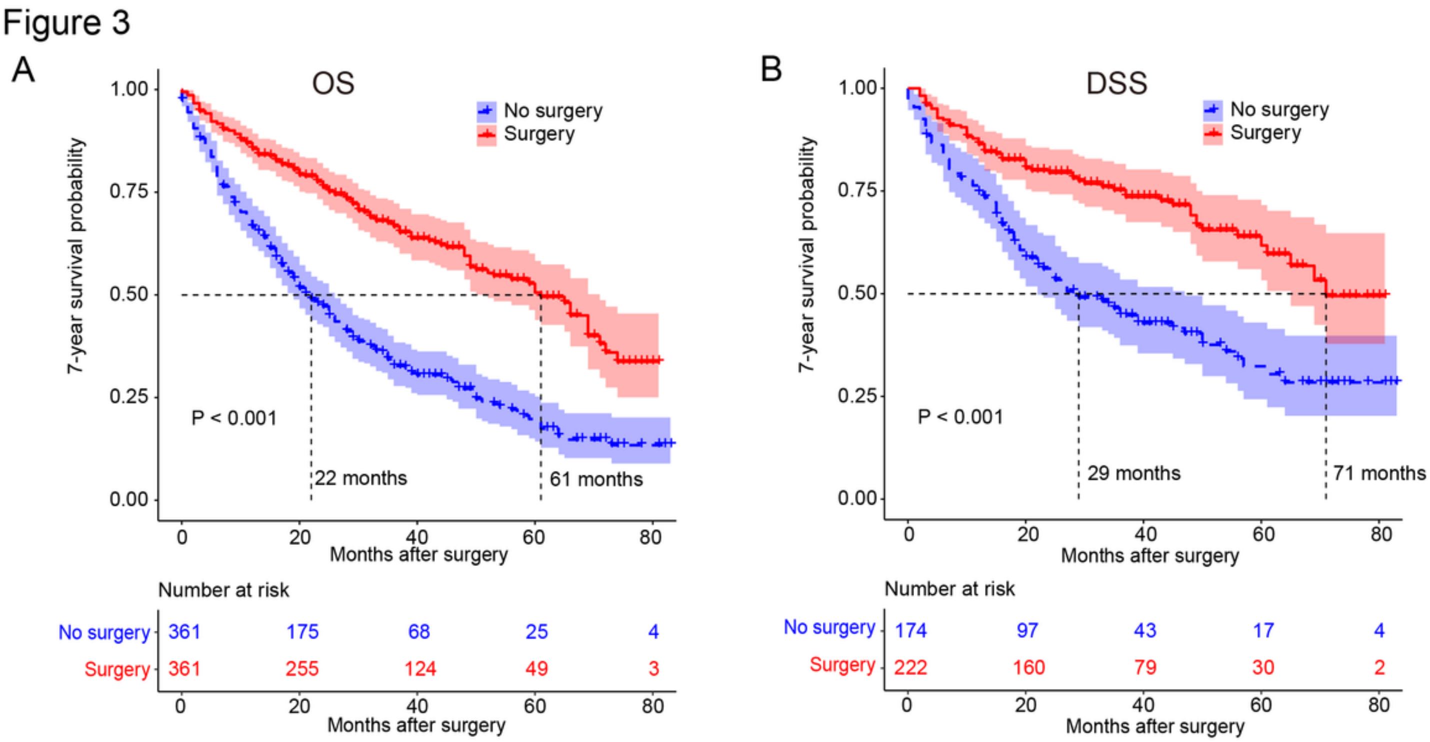

Figure 3

Survival analysis for overall survival and disease-specific survival of older patients with stage IB NSCLC after propensity score matching. (A) K-M curves of overall survival (OS); (B) K-M curves of disease-specific survival (DSS).

Figure 4

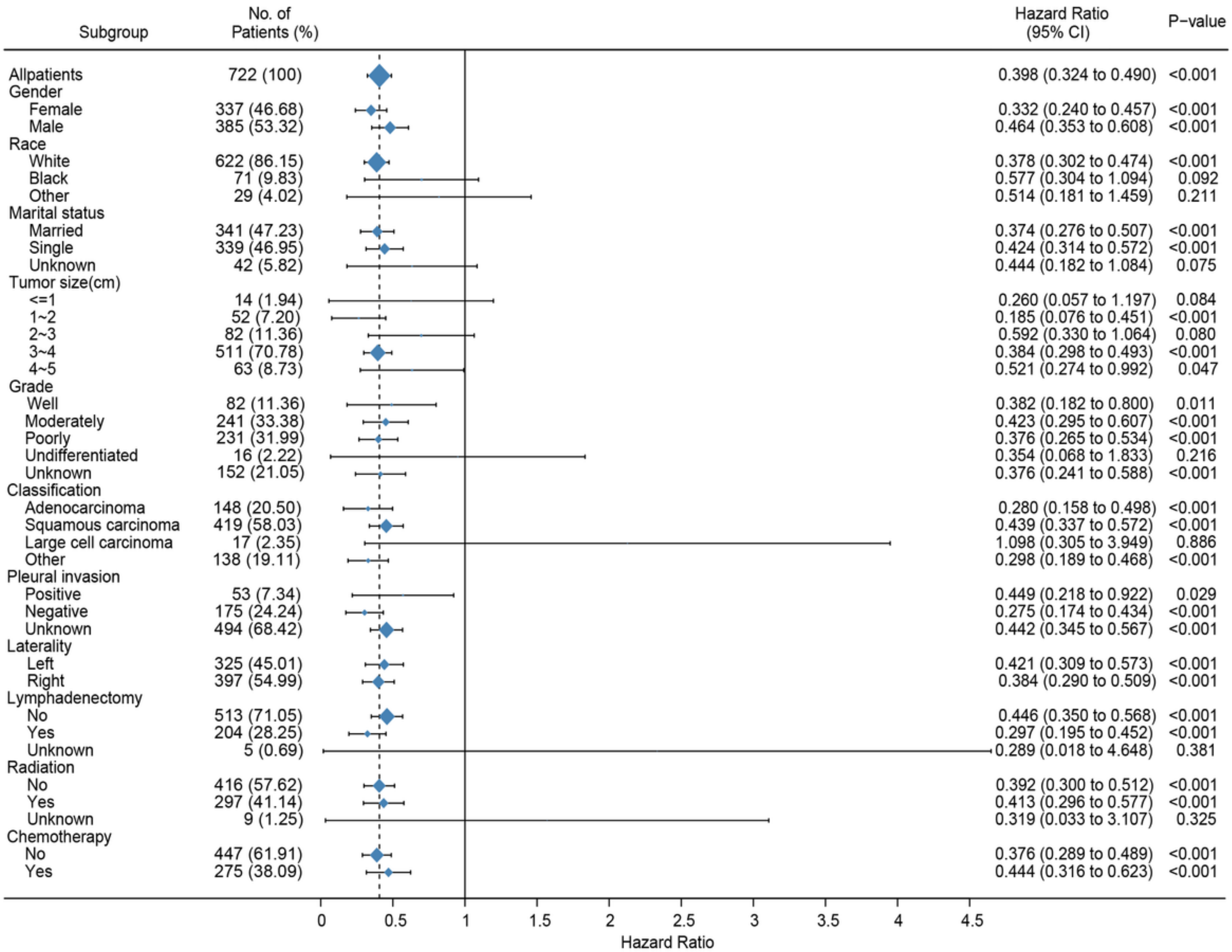

Figure 4

Subgroup analysis for overall survival of older patients with stage IB NSCLC after propensity score matching.

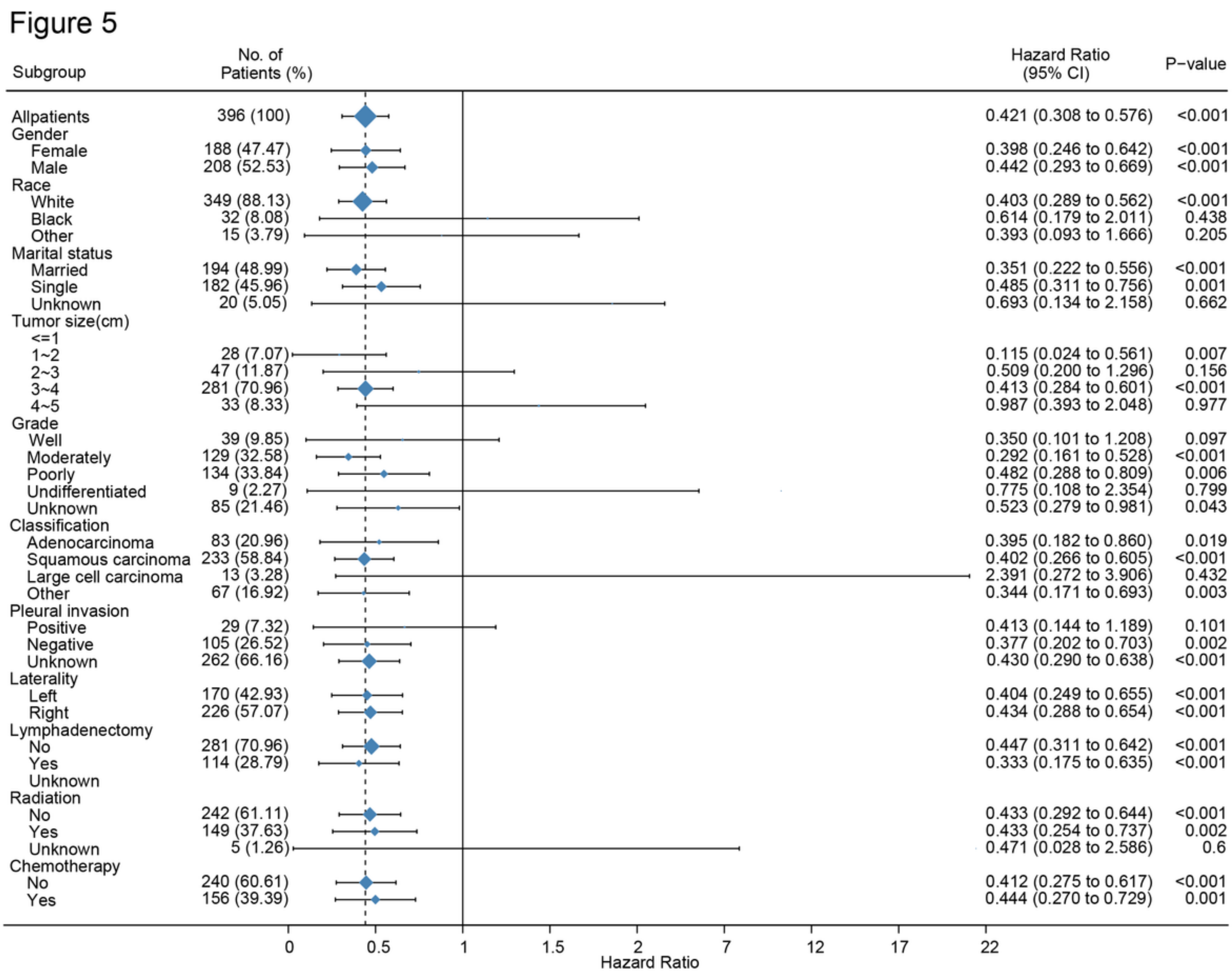

Figure 5

Subgroup analysis for disease-specific survival of older patients with stage IB NSCLC after propensity score matching.

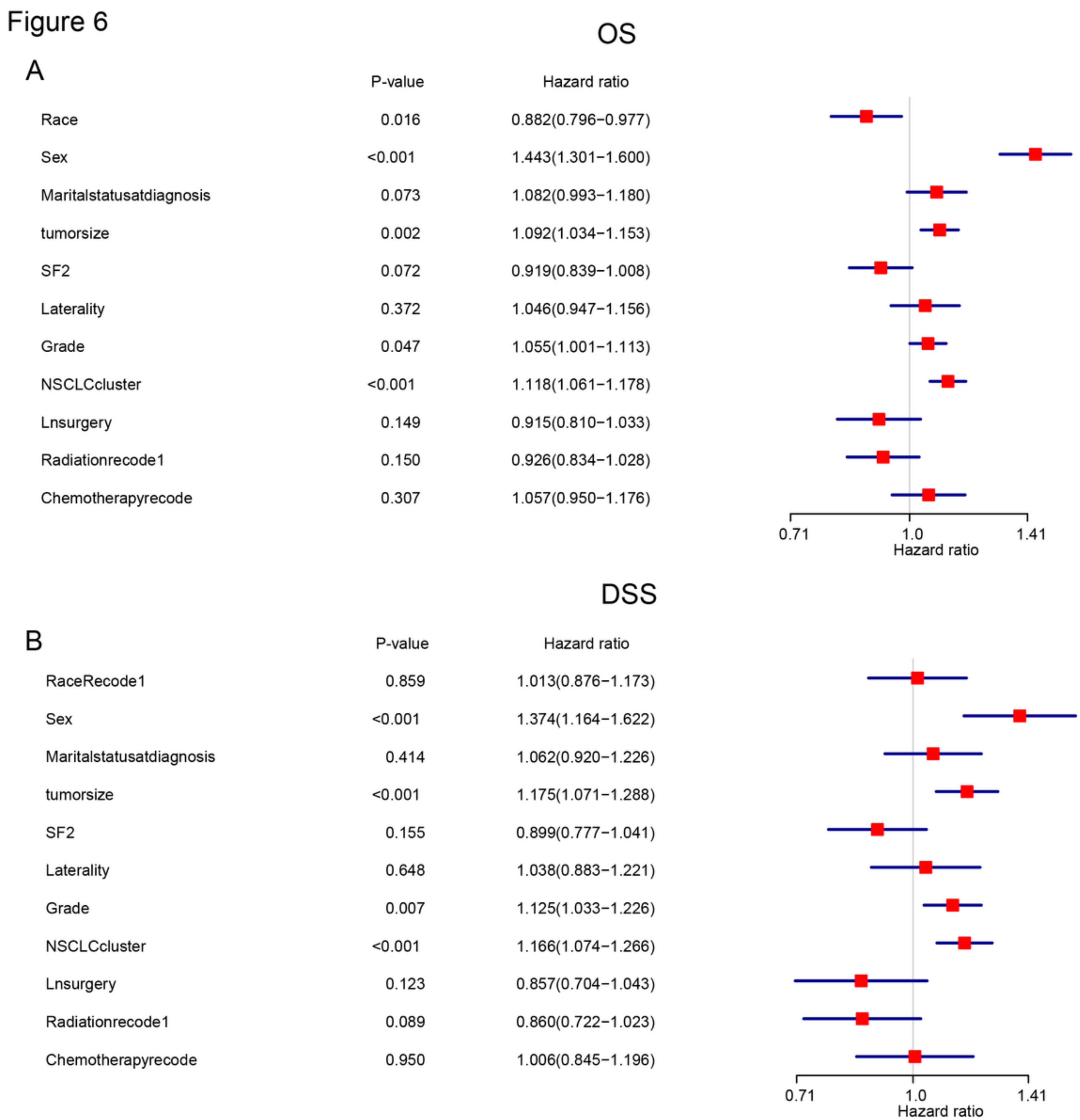

Figure 6

Multivariate Cox analysis for overall survival and disease-specific survival of older patients with stage IB NSCLC underwent surgery. (A) Multivariate Cox analysis for overall survival (OS); (B) Multivariate Cox analysis for disease-specific survival (DSS).

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- FigureS1.pdf
- FigureS2.pdf