

Research Article

Patterns of Disease and Treatment Among Long-Term Survivors With Small-Cell Lung Cancer

 Kübra Canaslan,¹  İlhan Öztop²

¹Department of Medical Oncology, Mehmet Akif İnan Training and Research Hospital, Şanlıurfa, Türkiye

²Department of Medical Oncology, Dokuz Eylül University, İzmir, Türkiye

Abstract

Objectives: Long-term survival in small-cell lung cancer (SCLC) is uncommon and poorly characterized. We aimed to describe the clinical, treatment-related, and survival features of patients with SCLC surviving at least 36 months.

Methods: This single-center retrospective cohort included patients with pathologically confirmed SCLC diagnosed between 2013 and 2023. Long-term survival was defined as overall survival (OS) of at least 36 months. Clinical and treatment data were collected from electronic records. Survival was estimated using Kaplan–Meier methods. No patient received immune checkpoint inhibitors.

Results: Among 396 evaluable patients, 53 (13.4%) achieved long-term survival; 41 (77.4%) had limited-stage and 12 (22.6%) extensive-stage disease. Among limited-stage survivors, 10 underwent surgery, 23 received concurrent chemoradiotherapy, and 21 had no documented recurrence; 65.0% of relapses were platinum-sensitive. Among extensive-stage survivors, 75.0% had a single metastatic site and 58.3% received consolidative thoracic radiotherapy. Median OS was 63.1 months overall, 63.1 months in limited-stage, and 53.7 months in extensive-stage disease. Post-landmark OS did not differ significantly by stage ($p=0.78$).

Conclusion: Long-term survival occurred in a small but clinically meaningful subgroup. Limited disease burden, multi-modality treatment, durable disease control, and platinum sensitivity may characterize favorable outcomes, although these associations require confirmation in larger comparative studies including contemporary treatment cohorts.

Keywords: Prognosis, small cell lung carcinoma, survival analysis

Cite This Article: Canaslan K, Öztop İ. Patterns of Disease and Treatment Among Long-Term Survivors With Small-Cell Lung Cancer. EJMI 2026;10(4):500–507.

Small-cell lung cancer (SCLC) is an aggressive neuroendocrine malignancy characterized by rapid growth, early metastatic spread, high initial sensitivity to chemotherapy, and frequent relapse.^[1] Although it accounts for approximately 15% of all lung cancers, SCLC is responsible for a disproportionate burden of lung cancer mortality because most patients present

with advanced disease and durable disease control remains uncommon.^[1,2]

Platinum-etoposide-based chemotherapy remains the backbone of treatment for both limited-stage (LS) and extensive-stage (ES) SCLC.^[3,4] In LS-SCLC disease, concurrent or sequential thoracic radiotherapy is an essential component of curative-intent treatment, whereas ES-SCLC is primarily

Address for correspondence: Kübra Canaslan, MD, Department of Medical Oncology, Mehmet Akif İnan Training and Research Hospital, Şanlıurfa, Türkiye

Phone: +90 505 360 93 65 **E-mail:** kubracanaslan@gmail.com

Submitted Date: August 22, 2026 **Revised Date:** September 07, 2026 **Accepted Date:** September 14, 2026

©Copyright 2026 by Eurasian Journal of Medical Investigation - Available online at www.ejmi.org

OPEN ACCESS This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.



managed with systemic therapy.^[3,4] The incorporation of immune checkpoint inhibitors into contemporary treatment has improved survival in both ES- and LS-SCLC, although the timing and treatment strategy differ between the two settings.^[5-7] Even in limited-stage disease, where long-term remission is more achievable, relapse remains frequent and only a subset of patients achieves prolonged survival.^[8]

Patients who survive substantially longer than expected represent an underexplored clinical subgroup. Understanding the characteristics of these long-term survivors may provide useful real-world insight into patterns of disease biology, treatment exposure, multimodality care, recurrence, and survivorship in SCLC. However, available data on long-term survivors are limited, and many reports consist of individual cases or small heterogeneous series.^[9-11]

Therefore, this study aimed to describe the clinical, pathological, treatment-related, relapse, and survival characteristics of patients with SCLC who achieved long-term survival in a real-world single-center cohort.

Methods

Study design and patient selection

This single-center retrospective cohort study included patients diagnosed with pathologically confirmed SCLC at a tertiary oncology center. Patients with incomplete pathology reports or insufficient follow-up were excluded. Long-term survival was defined as overall survival (OS) of at least 36 months from the date of SCLC diagnosis. A 36-month threshold was used to focus on sustained survival and provide a stringent operational definition, consistent with previous reports using a 3-year threshold. Patients meeting this criterion formed the main analytic cohort. The patient selection process is summarized in Figure 1.

The study included patients diagnosed between January 2013 and June 2023. The data cutoff was June 2026. This period was selected to ensure relative treatment homogeneity, as immune checkpoint inhibitors were not routinely incorporated into first-line SCLC management at our institution during the study period. Accordingly, no patient in the cohort received immunotherapy.

Data collection

Clinical, pathological, treatment-related, and outcome data were retrospectively collected from electronic medical records. Variables included age, sex, stage at diagnosis, smoking status, histology, immunohistochemical markers, Ki-67, lactate dehydrogenase (LDH), treatment modalities, prophylactic cranial irradiation, metastatic sites at initial presentation, recurrence or progression pattern, and survival status.

Definitions

Disease stage was classified as LS- or ES-SCLC according to the Veterans Administration Lung Study Group (VALSG) system.^[12] Platinum-sensitive relapse is defined as a progression-free interval of 90 days or more following the completion of primary platinum-based chemotherapy. Locoregional recurrence is defined as recurrence at the primary tumor site and/or regional lymph nodes. Metastatic and recurrence sites were ascertained primarily from radiological reports and clinical records; pathological confirmation was incorporated when available but was not required. OS was calculated from the date of SCLC diagnosis to death from any cause or last follow-up. Patients alive at last follow-up were censored at that date.

Statistical analysis

Analyses were performed using IBM SPSS Statistics version 31.0 (IBM Corp., Armonk, NY, USA) and R, version 4.5.1 (R Foundation for Statistical Computing, Vienna, Austria). The analyses were primarily descriptive. Categorical variables were summarized as frequencies and percentages. Continuous variables were summarized as mean with range and/or median with interquartile range (IQR), as appropriate. To describe survival after achievement of the predefined long-term survival threshold, a 36-month landmark analysis was performed. Post-landmark OS was calculated from 36 months after diagnosis to death or last follow-up. Survival curves were estimated using the Kaplan–Meier method and compared using the log-rank test. This comparison was considered exploratory and descriptive because the cohort was restricted to patients who had already achieved long-term survival. No multivariable prognostic modeling was performed because detailed clinicopathological and treatment-related data were not available for patients who survived less than 36 months. Therefore, the study was designed to describe the clinical profile and treatment patterns of long-term survivors. A two-sided $p < 0.05$ was considered statistically significant for exploratory comparisons.

Ethics Committee Approval

The study was approved by the Dokuz Eylül University Non-Interventional Research Ethics Committee (no: 2023/39-14, date: 06.12.2023). The study was conducted in accordance with the principles of the Declaration of Helsinki. Informed consent was waived due to the retrospective design and use of de-identified data.

Results

Patient characteristics

The patient selection process and classification of long-term survivors are summarized in Figure 1. Among 396

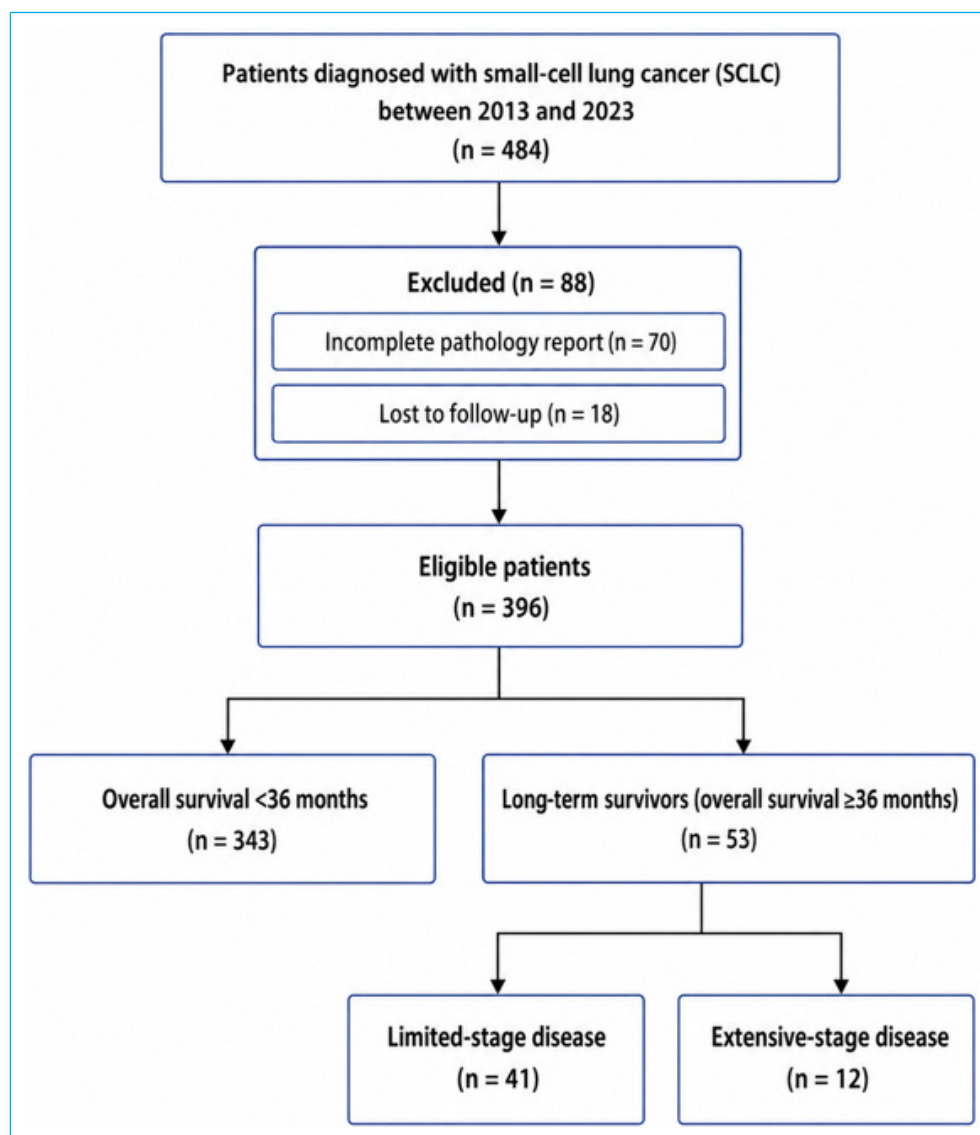


Figure 1. Study flowchart.

evaluable patients with SCLC, 53 achieved long-term survival, defined as OS of at least 36 months, corresponding to a long-term survivor proportion of 13.4%. Of these patients, 41 (77.4%) had limited-stage disease and 12 (22.6%) had extensive-stage disease at diagnosis. Baseline demographic and pathological characteristics are summarized in Table 1.

The median age at diagnosis was 64.0 years, with an IQR of 56 to 68 years. Twenty-five patients (47.2%) were female. Smoking exposure was common; 51 (96.2%) were current or former smokers. Pure SCLC histology was reported in 48 patients (90.6%), while combined histology was observed in 5 patients (9.4%), all of whom had limited-stage disease. The median Ki-67 index was 90% (IQR 87.5-90), and the median LDH level was 210 U/L (IQR 180-236.5).

Limited-stage long-term survivors

Among 41 patients with limited-stage disease, 10 patients (24.4%) underwent surgical resection followed by adjuvant therapy, 23 (56.1%) received concurrent chemoradiotherapy, and 8 (19.5%) received systemic therapy only. Prophylactic cranial irradiation was performed in 23 patients (56.1%). During follow-up, 21 limited-stage patients (51.2%) had no documented recurrence, whereas 11 patients (26.8%) developed locoregional recurrence and 9 patients (22.0%) developed distant recurrence. Among the 20 patients who experienced recurrence, 13 (65.0%) had platinum-sensitive relapse. Among patients with distant recurrence, the most common site was the brain, observed in 6 of 9 patients (66.7%), followed by the adrenal gland in 4 patients (44.4%), distant lymph nodes in 3 patients (33.3%), bone in 2 patients (22.2%), and liver in 1 patient (11.1%). Treatment,

Table 1. Baseline and pathological characteristics of long-term survivors according to stage

Variable	All patients, n=53	Limited-stage, n=41	Extensive-stage, n=12
Age at diagnosis, years, median (IQR)	64 (56–68)	62 (56–67)	67 (59–72.5)
Female sex	25 (47.2)	19 (46.3)	6 (50.0)
Current/former smoker	51 (96.2)	39 (95.2)	12 (100)
Pack-years, median (IQR)	45 (30–67.5)	38 (30–70)	50 (45–60)
Pure SCLC histology	48 (90.6)	36 (87.8)	12 (100)
Combined histology	5 (9.4)	5 (12.2)	0 (0)
Ki-67, %, median (IQR)	90 (87.5–90)	90 (87.5–90)	90 (88.75–90)
LDH (U/L), median (IQR)	210 (180–236.5)	210.5 (162–239)	202 (188–229.5)
Chromogranin positive	42/50 (84.0)	32/38 (84.2)	10/12 (83.3)
Synaptophysin positive	46/52 (88.5)	34/40 (85.0)	12/12 (100)
TTF-1 positive	39/46 (84.8)	30/35 (85.7)	9/11 (81.8)
CD56 positive	42/45 (93.3)	35/37 (94.6)	7/8 (87.5)
Pancytokeratin positive	35/36 (97.2)	26/27 (96.3)	9/9 (100)

IQR: Interquartile range; SCLC: Small cell lung cancer; LDH: Lactate dehydrogenase; TTF-1: Thyroid transcription factor-1; CD56: Cluster of differentiation 56.

recurrence, and subsequent therapy characteristics of limited-stage long-term survivors are presented in Table 2.

Extensive-stage long-term survivors

Among 12 patients with extensive-stage disease, the most common metastatic site was the brain, observed in 6 patients (50.0%), followed by bone and adrenal metastases in 3 patients each (25.0%), distant lymph node metastasis in 3 patients (25.0%), and liver metastasis in 1 patient (8.3%). The first-line chemotherapy consisted of cisplatin-etoposide in 7 patients (58.3%) and carboplatin-etoposide in 5 patients (41.7%). Consolidative thoracic radiotherapy was performed in 7 patients (58.3%), and prophylactic cranial irradiation was performed in 3 patients (25.0%). Progression after platinum-etoposide chemotherapy was documented in 6 of 12 patients (50.0%). Among these 6 patients, 2 (33.3%) had platinum-sensitive progression. Treatment, progression, metastatic pattern, and subsequent therapy characteristics of extensive-stage long-term survivors are shown in Table 3.

Survival outcomes

At the data cutoff, the median follow-up duration was 92.9 months. During follow-up, 30 patients died, while 23 were alive and censored at their last assessment. The median OS from diagnosis was 63.1 months (95% CI, 48.5–77.7). When stratified by stage, the median OS was 63.1 months (95% CI, 30.3–95.8) for limited-stage patients and 53.7 months (95% CI, 38.1–69.3) for extensive-stage patients. In the landmark survival at 36 months after diagnosis, median post-landmark OS was 27.1 months in limited-stage pa-

tients and 17.7 months in extensive-stage patients. There was no statistically significant difference in post-landmark OS between limited-stage and extensive-stage long-term survivors (log-rank $p=0.78$) (Fig. 2). This comparison was exploratory and descriptive because all patients included in the analysis had already survived beyond the 36-month landmark.

Discussion

In this single-center retrospective study, 53 of 396 evaluable patients with SCLC survived for at least 36 months, corresponding to an observed long-term survivor proportion of 13.4%. Most long-term survivors had limited-stage disease, although 12 patients had extensive-stage disease at diagnosis. These findings support the clinical heterogeneity of SCLC and indicate that prolonged survival, while more frequent in limited-stage disease, may also occur in a selected subgroup of patients with extensive-stage disease. However, because detailed data were unavailable for patients who survived less than 36 months, the characteristics observed in this cohort should not be interpreted as predictors of long-term survival.

There is no universally accepted definition of long-term survival in SCLC, and thresholds ranging from 18 to 36 months have been used in previous studies.^[11,13–15] We selected 36 months as a stringent and clinically meaningful cutoff to identify patients whose survival clearly exceeded the expected disease course. Earlier reports have suggested that patients surviving beyond approximately 30 months represent a distinct clinical population in whom

Table 2. Treatment and recurrence characteristics of limited-stage long-term survivors

Variable	Limited-stage, n=41
Initial treatment	
Surgical resection and adjuvant therapy	10 (24.4)
Concurrent chemoradiotherapy	23 (56.1)
Systemic therapy only	8 (19.5)
Adjuvant/concurrent/systemic chemotherapy	
Cisplatin-etoposide	30 (73.2)
Carboplatin-etoposide	11 (26.8)
Maintenance oral etoposide	6 (14.6)
Completion of planned therapy	35 (85.4)
Prophylactic cranial irradiation	23 (56.1)
First Recurrence Pattern	
No recurrence	21 (51.2)
Locoregional recurrence	11 (26.8)
Distant recurrence	9 (22.0)
Platinum-sensitive relapse	13/20 (65.0)
Post-recurrence therapies	
Platinum-etoposide	11/20 (55.0)
Topotecan/irinotecan	4/20 (20.0)
CAV	1/20 (5.0)
Other chemotherapies*	2/20 (10.0)
SBRT	2/20 (10.0)
Site of distant recurrence**	
Bone	2/9 (22.2)
Brain	6/9 (66.7)
Distant Lymph Nodes	3/9 (33.3)
Adrenal	4/9 (44.4)
Liver	1/9 (11.1)

*Other chemotherapies include vinorelbine (n=1) and platinum-taxane (n=1)

**Sites of distant recurrence were not mutually exclusive. CAV: Cyclophosphamide, Doxorubicin, Vincristine; SBRT: Stereotactic body radiotherapy.

late relapse, second primary malignancies, and non-cancer-related mortality become increasingly relevant.^[16] Although differences in stage distribution, treatment era, and survival definitions limit direct comparisons, the proportion observed in our cohort is broadly consistent with previous real-world reports describing a small but clinically meaningful group of long-term survivors.^[11]

The predominance of limited-stage disease was expected given the strong prognostic effect of stage. Nevertheless, the presence of 12 extensive-stage long-term survivors is notable because ES-SCLC historically has a median survival of approximately 8–13 months and a

Table 3. Treatment, progression, metastatic pattern, and survival characteristics of extensive-stage long-term survivors

Variable	Extensive-stage, n=12
Systemic chemotherapy	
Cisplatin-etoposide	7 (58.3)
Carboplatin-etoposide	5 (41.7)
Maintenance oral etoposide	4 (33.3)
Consolidative thoracic radiotherapy	7 (58.3)
Prophylactic cranial irradiation	3 (25.0)
Progression and subsequent treatment	
Progression after platinum-etoposide	6/12 (50)
Platinum-sensitive progression	2/6 (33.3)
Post-recurrence chemotherapy	
Platin-etoposide	2/6 (33.3)
CAV	2/6 (33.3)
Irinotecan	2/6 (33.3)
Sites of metastasis	
Brain metastasis	6/12 (50.0)
Bone metastasis	3/12 (25.0)
Adrenal metastasis	3/12 (25.0)
Distant lymph node metastasis	3/12 (25.0)
Liver metastasis	1/12 (8.3)
Number of involved metastatic sites	
One metastatic site	9 (75.0)
Two metastatic sites	2 (16.7)
Three metastatic sites	1 (8.3)

CAV: Cyclophosphamide, Doxorubicin, Vincristine.

5-year survival historically ranging from 5% to 12%.^[17] Most extensive-stage survivors in our cohort had only one involved metastatic site, and liver involvement was uncommon. This pattern resembles the favorable phenotype reported in other long-survivor cohorts, which is characterized by lower metastatic burden, better performance status, fewer liver or bone metastases, and durable treatment response.^[14]

Long-term survival in both stage groups appeared to occur in the context of sustained disease control and multimodality treatment. Most limited-stage patients received definitive local therapy, approximately half remained recurrence-free, and most relapsing patients retained platinum sensitivity. Similarly, more than half of the extensive-stage survivors received consolidative thoracic radiotherapy. These findings suggest that prolonged survival may reflect the interaction of effective thoracic control, limited disease burden, and intrinsically chemosensitive

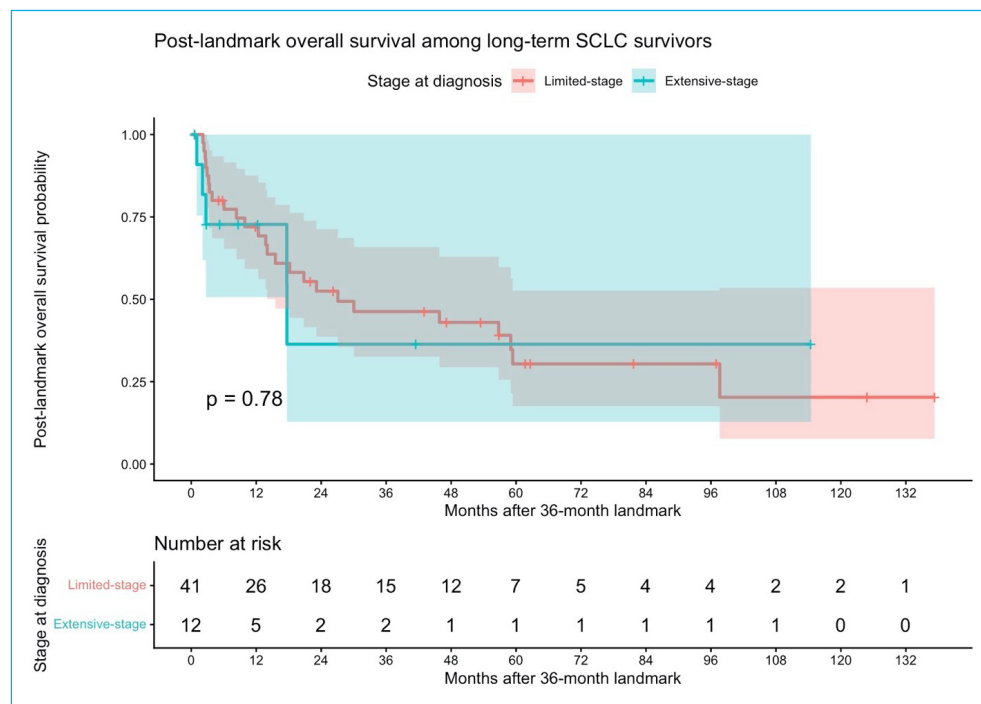


Figure 2. Kaplan–Meier curves of post-landmark overall survival according to stage at diagnosis. Time zero represents the 36-month landmark.

tumor biology rather than the effect of a single treatment modality.^[13,14,16,18,19] However, treatment-selection bias is unavoidable, because patients receiving surgery, radiotherapy, or further systemic treatment are generally those with better performance status, responsive disease, and sufficient clinical stability. Our data therefore cannot determine whether local treatment improved survival or merely identified patients with more favorable disease.

Brain involvement remained clinically relevant, as half of the extensive-stage survivors had brain metastases and the brain was the most frequent site of distant relapse in limited-stage disease. Similarly, previous long-survivor cohorts have suggested that brain metastases may be less strongly associated with poor outcome than liver or bone involvement, possibly because effective central nervous system (CNS)-directed treatment can mitigate their prognostic impact.^[13] These findings indicate that CNS disease does not necessarily preclude prolonged survival, while emphasizing the brain as a persistent sanctuary site. Although prophylactic cranial irradiation historically reduced brain metastases, its independent contribution to long-term survival cannot be determined in this retrospective cohort.^[20,21]

None of the patients received immune checkpoint inhibitors. The study therefore provides a relatively homogeneous benchmark for long-term survival achieved in the chemotherapy- and radiotherapy-era, but its generalizability to current practice is limited. Contempo-

rary chemoimmunotherapy may increase the number of long survivors, although durable benefit remains restricted to a minority of patients.^[22] Whether low metastatic burden, platinum sensitivity, and suitability for local consolidation remain equally relevant in the immunotherapy era is uncertain.

This study is limited by its retrospective single-center design, missing data, treatment heterogeneity, and the small number of extensive-stage survivors. The exclusion of patients lost to follow-up may have influenced the observed proportion of long-term survivors. Most importantly, the absence of a comparator group with survival shorter than 36 months prevented identification of independent prognostic factors. Performance status, comorbidities, late toxicities, second primary malignancies, quality of life, and molecular or immune biomarkers were also not systematically available. Cause-of-death information was unavailable, precluding differentiation between cancer-related and non-cancer-related mortality in this cohort. The small extensive-stage subgroup and declining numbers at risk during follow-up limited the ability of the exploratory post-landmark comparison to detect clinically meaningful survival differences.

Conclusion

In conclusion, survival beyond 36 months was observed in 13.4% of evaluable patients with SCLC. Long-term sur-

vival was more common in limited-stage disease but was also observed in selected patients with extensive-stage disease. The findings suggest that limited disease burden, absence of liver metastasis, durable treatment response, platinum sensitivity, and the ability to receive multimodality therapy may characterize patients with unusually favorable outcomes, although comparative studies are required to confirm these associations.

Disclosures

Ethics Committee Approval: The study was approved by the Dokuz Eylül University Non-Interventional Research Ethics Committee (no: 2023/39-14, date: 06.12.2023).

Informed Consent: Informed consent was waived due to the retrospective design and use of de-identified data.

Conflicts of Interest: The authors declared no conflicts of interest.

Funding: The authors declared no funding or financial support.

Use of AI for Writing Assistance: The authors declared that no artificial intelligence (AI)-assisted technologies, including large language models (LLMs), chatbots, or image generation tools, were used in the preparation of this manuscript.

Authorship Contributions: Concept – KC, İÖ; Design – KC; Supervision – İÖ; Data Collection or Processing: KC; Analysis or Interpretation: KC; Literature Search: KC; Writing: KC, İÖ; Critical Review: KC, İÖ.

Peer-review: Externally peer-reviewed.

References

1. Rudin CM, Brambilla E, Faivre-Finn C, Sage J. Small-cell lung cancer. *Nat Rev Dis Primers* 2021;7(1):3. [CrossRef]
2. Sung H, Filho AM, Laversanne M, Ferlay J, Siegel RL, Soerjomataram I, et al. Global cancer statistics 2024: GLOBOCAN estimates of incidence and mortality worldwide for 34 cancers in 186 countries. *CA Cancer J Clin* 2026;76(4): e70090. [CrossRef]
3. ESMO Clinical Practice Guideline: Small Cell Lung Cancer. Available at: <https://www.esmo.org/guidelines/esmo-clinical-practice-guideline-small-cell-lung-cancer>. Accessed Jul 12, 2026.
4. NCCN Guidelines: Small Cell Lung Cancer. Available at: <https://www.nccn.org/guidelines/guidelines-detail?category=1&id=1462>. Accessed Jul 12, 2026.
5. Horn L, Mansfield AS, Szczesna A, Havel L, Krzakowski M, Hochmair MJ, et al; IMpower133 Study Group. First-line atezolizumab plus chemotherapy in extensive-stage small-cell lung cancer. *N Engl J Med* 2018;379(23):2220–9. [CrossRef]
6. Paz-Ares L, Chen Y, Reinmuth N, Hotta K, Trukhin D, Statsenko G, Hochmair MJ, et al. Durvalumab, with or without tremelimumab, plus platinum-etoposide in first-line treatment of extensive-stage small-cell lung cancer: 3-year overall survival update from CASPIAN. *ESMO Open* 2022;7(2):100408. [CrossRef]
7. Cheng Y, Spigel DR, Cho BC, Laktionov KK, Fang J, Chen Y, et al; ADRIATIC Investigators. Durvalumab after chemoradiotherapy in limited-stage small-cell lung cancer. *N Engl J Med* 2024;391(14):1313–27. [CrossRef]
8. Ellis PM, Swaminath A, Pond GR. Patterns of relapse in small cell lung cancer: competing risks of thoracic versus CNS relapse. *Curr Oncol* 2021;28(4):2778–88. [CrossRef]
9. Zhang X, Zheng J, Niu Y, Xue C, Yu Y, Tan K, et al. Long-term survival in extensive-stage small-cell lung cancer treated with different immune checkpoint inhibitors in multiple-line therapies: A case report and literature review. *Front Immunol* 2022;13:1059331. [CrossRef]
10. Tartarone A, Leroise R, Ardito R, Troiani L, Tedesco B, Bozza G, et al. Long-term survival in small cell lung cancer: a case report and review of the literature. *Future Oncol* 2014;10(4):523–8. [CrossRef]
11. Maneenil K, Molina J, She J, Gupta R, Aubry M, Yi E, et al. P1.07-045 Characteristics of exceptional long term survivors in extensive stage small cell lung cancer. *J Thorac Oncol* 2017;12(1)–5. [CrossRef]
12. Zelen M. Keynote address on biostatistics and data retrieval. *Cancer Chemother Rep* 3 1973;4(2):31–42.
13. Hatakeyama Y, Morinaga D, Sakakibara-Konishi J, Azuma R, Tsuji K, Ito S, et al. Clinical characteristics of long-term survivors of small cell lung cancer. *Respir Investig* 2026;64(4):101468. [CrossRef]
14. Gobbi E, Diallo MH, Pasquier D, Schneider S, Chouaid C, Debieuvre D, et al. Clinical characteristics and management of long survivors in extensive stage small cell lung cancer. *Lung Cancer* 2025;202:108499. [CrossRef]
15. Li X, Li DX, Jin H, Liu J, Han J, Zhang X, et al. Prognostic factors and prediction of long-term survival in ES-SCLC. *J Clin Oncol* 2025;43(16 Suppl): e2011. [CrossRef]
16. Jacoulet P, Depierre A, Moro D, Rivière A, Milleron B, Quoix E, et al. Long-term survivors of small-cell lung cancer (SCLC): a French multicenter study. *Groupe d'Oncologie de Langue Française. Ann Oncol* 1997;8(10):1009–14. [CrossRef]
17. Lally BE, Urbanic JJ, Blackstock AW, Miller AA, Perry MC. Small cell lung cancer: have we made any progress over the last 25 years? *Oncologist* 2007;12(9):1096–104. [CrossRef]
18. Liu SV, Mok TSK, Nabat BY, Mansfield AS, De Boer R, Losonczy G, et al. Clinical and molecular characterization of long-term survivors with extensive-stage small cell lung cancer treated with first-line atezolizumab plus carboplatin and etoposide. *Lung Cancer* 2023;186:107418. [CrossRef]

19. Slotman BJ, van Tinteren H, Praag JO, Kneijens JL, El Sharouni SY, Hatton M, et al. Use of thoracic radiotherapy for extensive stage small-cell lung cancer: a phase 3 randomised controlled trial. *Lancet* 2015;385(9962):36–42. Erratum in: *Lancet* 2015;385(9962):28. [\[CrossRef\]](#)
20. Takahashi T, Yamanaka T, Seto T, Harada H, Nokihara H, Saka H, et al. Prophylactic cranial irradiation versus observation in patients with extensive-disease small-cell lung cancer: a multicentre, randomised, open-label, phase 3 trial. *Lancet Oncol* 2017;18(5):663–71. [\[CrossRef\]](#)
21. Aupérin A, Arriagada R, Pignon JP, Le Péchoux C, Gregor A, Stephens RJ, et al. Prophylactic cranial irradiation for patients with small-cell lung cancer in complete remission. Prophylactic Cranial Irradiation Overview Collaborative Group. *N Engl J Med* 1999;341(7):476–84. [\[CrossRef\]](#)
22. Falchero L, Amrane K, Godbert B, Leterre B, Madelaine J, Fournel P, et al. Long-term response and survival in extensive-stage SCLC receiving atezolizumab plus chemotherapy in a real-world setting: IFCT-1905 CLINATEZO. *JTO Clin Res Rep* 2026;7(4):100964. [\[CrossRef\]](#)