

Radiotherapy Guideline for Small Cell Lung Cancer

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檢閱後無異動	

RT indication

- 1. General
 - RT is indicated across all stages of SCLC, for either definitive or palliative purposes.
- 2. Early-stage (I–IIA, T1–2N0M0)
 - Postoperative RT (PORT): Recommended for pN2, may be considered for pN1.
 - Non-surgical candidates: SABR to the primary tumor, followed by systemic therapy.
- 3. Limited-stage disease
 - Thoracic RT: Standard combined with chemotherapy.
 - Prophylactic Cranial Irradiation (PCI): Recommended for patients with complete or good response to initial therapy.
- 4. Extensive-stage disease
 - Consolidative thoracic RT: For selected responders to systemic therapy with residual thoracic disease.
 - PCI: May be considered in responders to systemic therapy.
- 5. Brain metastases
 - Typically WBRT; SRT/SRS for selected patients with limited lesions.
- 6. Palliative RT:
 - For symptom relief or prevention (e.g., pain, bleeding, obstruction).

Simulation and immobilization

- Simulation should be performed using CT scans obtained in the radiotherapy (RT) treatment position with appropriate immobilization devices. Intravenous (IV) contrast, with or without oral contrast, is recommended whenever possible

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for patients with central tumors or nodal disease to improve target and organ delineation.

- CT-based treatment planning should employ multiple conformal fields. Advanced techniques such as IMRT (intensity-modulated radiotherapy), VMAT (volumetric-modulated arc therapy), TomoTherapy, or Radixact may be utilized to optimize normal tissue sparing, with appropriate quality assurance (QA) measures and attention to tissue interfraction mobility.
- PET/CT improves target definition accuracy, particularly in cases with significant atelectasis or when IV contrast is contraindicated.
- Tumor and organ motion, especially due to respiration, should be evaluated at simulation. Strategies include fluoroscopy, inhale/exhale or slow-scan CT, or ideally, 4D-CT to better characterize motion.

Field design and treatment volume

- Target volumes should be defined for 3D-CRT (three-dimensional conformal radiotherapy), IMRT (intensity-modulated radiotherapy), VMAT (volumetric-modulated arc therapy), TomoTherapy, and Radixact according to standard oncologic and imaging principles.
- GTV (gross tumor volume): the visible or demonstrable extent of disease (primary and nodal) based on imaging and pathology.
- iGTV (internal gross tumor volume): generated from 4D-CT or motion-inclusive imaging by encompassing the GTV across all respiratory phases, thereby accounting for tumor motion.
- CTV (clinical target volume): includes the iGTV plus regions at risk of microscopic spread.
- PTV (planning target volume): adds a setup margin to the CTV to account for daily positioning error and mechanical variability.

Dose prescriptions

1. Limited-stage thoracic RT

- Once-daily (QD): 60–70 Gy in conventional fractions (1.8–2.2 Gy per fraction).
- Twice-daily (BID): 45 Gy in 30 fractions (1.5 Gy BID over 3 weeks, with ≥ 6 hours interfraction interval).
- Both schedules are acceptable; regimen selection depends on institutional practice and patient condition.

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2. Consolidative thoracic RT (extensive-stage responders)
 - Individualized dosing within 30 Gy in 10 fractions to 60 Gy in 30 fractions (1.8–2.2 Gy per fraction).
3. Prophylactic Cranial Irradiation (PCI)
 - 25 Gy in 10 fractions (2.5 Gy per fraction).
 - 20 Gy in 5 fractions may be considered in extensive-stage patients or those with limited prognosis.
4. Whole-brain Radiotherapy (WBRT)
 - Standard regimens: 30 Gy in 10 fractions; 20 Gy in 5 fractions.
 - Other accepted regimens: 37.5 Gy in 15 fractions; 40 Gy in 20 fractions; 25 Gy in 10 fractions; 8 Gy in 1 fraction (pure palliation).
 - For patients with better prognosis (≥ 4 months), hippocampal-sparing WBRT using IMRT, VMAT, TomoTherapy, or Radixact may be considered.
5. Palliative RT (non-cranial metastases)
 - Common regimens: 30 Gy in 10 fractions, 20 Gy in 5 fractions, 8 Gy in 1 fraction.

Constraints for organ at risk

- Normal organ dose responses from the QUANTEC project.

Reference

- NCCN Practice Guidelines in Oncology, 2025
- Perez and Brady's : Principles and Practice of Radiation Oncology, 7th ed, 2018
- Eric K. Hansen, Handbook of Evidence-Based Radiation Oncology