

# 局限期小细胞肺癌放射治疗研究进展

《现代肿瘤医学》[ISSN:1672-4992/CN:61-1415/R] 期数: 2019年06期 页码: 1068-1072 栏目: 综述 出版日期: 2019-02-08

**Title:** Radiotherapy advances of limited-stage small cell lung cancer

**作者:** 张 晴; 屈艳丽; 刘航宇; 于 洪

中国医科大学肿瘤医院,辽宁省肿瘤医院胸部放疗科, 辽宁 沈阳 110042

**Author(s):** Zhang Qing; Qu Yanli; Liu Hangyu; Yu Hong

Radiation Oncology Department of Thoracic Cancer,Cancer Hospital of China Medical University,Liaoning Gancer Hospital & Institute,Liaoning Shenyang 110042,China.

**关键词:** 小细胞肺癌; 局限期; 治疗; 胸部放疗; 预防性脑照射

**Keywords:** small cell lung cancer; limited-stage; treatment; thoracic radiation therapy; prophylactic cranial irradiation

**分类号:** R734.2

**DOI:** 10.3969/j.issn.1672-4992.2019.06.040

**文献标识码:** A

**摘要:** 小细胞肺癌 (small cell lung cancer, SCLC) 是高度恶性肿瘤,生物学特点是倍增时间短、增殖指数高和侵袭能力强。尽管对化放疗高度敏感,但极易耐药和复发,预后很差。确诊时约1/3属于局限期 (limited-stage,LS)。LS-SCLC具有潜在治愈的可能,采用以铂类为基础的化疗联合胸部放疗,长期生存率达20%~25%。初治达完全或部分缓解的LS-SCLC患者行预防性脑照射(prophylactic cranial irradiation, PCI)可降低脑转移发生率,改善生活质量。随着SCLC患者生存期延长,局部治疗变得非常重要,如何最大程度地降低局部复发的危险性一直是临床研究热点。本文中我们分析了LS-SCLC放射治疗的研究现状,探索最佳放射剂量、次数、靶区、时机及PCI。

**Abstract:** Small cell lung cancer (SCLC) is a very aggressive malignancy characterized by rapid doubling time,high cellular proliferation and early metastatic spread.In fact,although SCLC is a chemosensitive and radiosensitive disease,the initial responsiveness to chemotherapy is usually followed by development of resistance and the prognosis remains poor.At the time of diagnosis,about a third of the patients are in the limited-stage (LS).LS-SCLC is a potentially curable disease with long-term survival of 20% to 25% when treated with platinum-based chemotherapy plus concurrent thoracic radiation.Prophylactic cranial irradiation (PCI) may decrease the incidence of brain metastases in patients with LS-SCLC and improve survival in patients achieving complete or partial remission after initial treatment.As the survival time of SCLC patients is prolonged,local treatment becomes very important.For all these reasons,how to reduce the risk of local recurrence has always been a hot topic in clinical research.In this review,we analyzed the current situation of radiation therapy for LS-SCLC,to explore the optimal PCI,timing,target volume,fraction and dose of radiotherapy.

## 参考文献/REFERENCES

- [1] Siegel RL,Miller KD,Jemal A.Cancer statistics,2018 [J] .CA Cancer J Clin,2018,68(1):7-30.
- [2] Low M,Ben-Or S.Thoracic surgery in early-stage small cell lung cancer [J] .Thorac Surg Clin,2018,28(1):9-14.
- [3] Rodriguez de Dios N,Calvo P,Rico M,et al.Recent developments in radiotherapy for small-cell lung cancer:A review by the Oncologic Group for the Study of Lung Cancer (Spanish Radiation Oncology Society) [J] .Clin Transl Oncol,2017,19(10):1183-1192.
- [4] Schroeder SA,Clark B,Cheng C,et al.Helping smokers quit:The smoking cessation leadership center engages behavioral health by challenging old myths and traditions [J] .J Psychoactive Drugs,2018,50(2):151-158.
- [5] Chen W,Zheng R,Baade PD,et al.Cancer statistics in China,2015 [J] .CA Cancer J Clin,2016,66(2):115-132.
- [6] Glatzer M,Schmid S,Radovic M,et al.The role of radiation therapy in the management of small cell lung cancer [J] .Breathe (Sheff), 2017, 13(4):e87-e94.
- [7] Tendler S,Grozman V,Lewensohn R,et al.Validation of the 8th TNM classification for small-cell lung cancer in a retrospective material from Sweden [J] .Lung Cancer,2018,120:75-81.
- [8] Nakahara Y,Sasaki J,Fukui T,et al.The role of prophylactic cranial irradiation for patients with small-cell

- lung cancer [J]. *Jpn J Clin Oncol*,2018,48(1):26-30.
- [9] Waqar SN,Morgensztern D.Treatment advances in small cell lung cancer(SCLC) [J]. *Pharmacol Ther*,2017,180:16-23.
- [10] Saito M,Shiraishi K,Goto A,et al.Development of targeted therapy and immunotherapy for treatment of small cell lung cancer [J]. *Jpn J Clin Oncol*,2018,48(7):603-608.
- [11] Borges M,Linnoila RI, van de Velde HJ, et al.An achaete-scute homologue essential for neuroendocrine differentiation in the lung [J]. *Nature*,1997,386(6627):852-855.
- [12] Linnoila RI,Zhao B,DeMayo JL,et al.Constitutive achaete-scute homologue-1 promotes airway dysplasia and lung neuroendocrine tumors in transgenic mice [J]. *Cancer Res*,2000,60(15):4005-4009.
- [13] Thomas A,Pommier Y.Small cell lung cancer:Time to revisit DNA-damaging chemotherapy [J]. *Sci Transl Med*,2016,8(346):346f12.
- [14] Rudin CM,Durinck S,Stawiski EW,et al.Comprehensive genomic analysis identifies SOX2 as a frequently amplified gene in small-cell lung cancer [J]. *Nat Genet*,2012,44(10):1111-1116.
- [15] Peifer M,Fernandez-Cuesta L,Sos ML,et al.Integrative genome analyses identify key somatic driver mutations of small-cell lung cancer [J]. *Nat Genet*,2012,44(10):1104-1110.
- [16] Chen KN.Small cell lung cancer and TNM staging [J]. *Chin J Lung Cancer*,2016,19(6):409-412. [陈克能.小细胞肺癌与TNM分期 [J]. *中国肺癌杂志*,2016,19(6):409-412.]
- [17] Li YX,Wang LH,Gao L,et al.Radiation oncology [M]. Beijing:Beijing Union Medical University Press,2018:768-780. [李焯雄,王绿化,高黎,等.肿瘤放射治疗学 [M].北京:中国协和医科大学出版社,2018:768-780.]
- [18] Nicholson AG,Chansky K,Crowley J,et al.The International Association for the Study of Lung Cancer Lung Cancer staging project:Proposals for the revision of the clinical and pathologic staging of small cell lung cancer in the forthcoming eighth edition of the TNM classification for lung cancer [J]. *J Thorac Oncol*,2016,11(3):300-311.
- [19] Sierocki JS,Hilaris BS,Hopfan S,et al.Cis-Dichlorodiammineplatinum (II) and VP-16-213:An active induction regimen for small cell carcinoma of the lung [J]. *Cancer Treat Rep*,1979,63(9-10):1593-1597.
- [20] Sabari JK,Lok BH,Laird JH,et al.Unravelling the biology of SCLC:Implications for therapy [J]. *Nat Rev Clin Oncol*,2017,14(9):549-561.
- [21] Rossi A,Tay R,Chiramel J,et al.Current and future therapeutic approaches for the treatment of small cell lung cancer [J]. *Expert Rev Anticancer Ther*,2018,18(5):473-486.
- [22] Warde P,Payne D.Does thoracic irradiation improve survival and local control in limited-stage small-cell carcinoma of the lung? A meta-analysis [J]. *J Clin Oncol*,1992,10(6):890-895.
- [23] Pujol JL,Carestia L, Daures JP.Is there a case for cisplatin in the treatment of small-cell lung cancer? A meta-analysis of randomized trials of a cisplatin-containing regimen versus a regimen without this alkylating agent [J]. *Br J Cancer*,2000,83(1):8-15.
- [24] Park J,Kang MK.Impact of radiation dose on concurrent chemoradiotherapy for limited-stage small-cell lung cancer [J]. *Radiat Oncol J*,2018,36(1):35-44.
- [25] Turrisi AT,Kim K.Twice-daily compared with once-daily thoracic radiotherapy in limited small-cell lung cancer treated concurrently with cisplatin and etoposide [J]. *N Engl J Med*,1999,340(4):265-271.
- [26] Faivre-Finn C,Falk S,Ashcroft L,et al.Protocol for the CONVERT trial-concurrent once-daily versus twice-daily radiotherapy:An international 2-arm randomised controlled trial of concurrent chemoradiotherapy comparing twice-daily and once-daily radiotherapy schedules in patients with limited stage small cell lung cancer (LS-SCLC) and good performance status [J]. *BMJ Open*,2016,6(1):e009849.
- [27] Rutter CE,Park HS,Corso CD,et al.Comparison of survival outcomes among standard radiotherapy regimens in limited-stage small cell lung cancer patients receiving concurrent chemoradiation [J]. *Lung Cancer*,2015,90(2):243-248.
- [28] Gensheimer MF,Loo BW.Optimal radiation therapy for small cell lung cancer [J]. *Curr Treat Options Oncol*,2017,18(4):21.
- [29] Shioyama Y,Nagata Y,Komiyama T,et al.Multiinstitutional retrospective study of stereotactic body radiation therapy for stage I small cell lung cancer:Japan radiation oncology study group (JROSG) [J]. *Int J Radiat Oncol Biol Phys*,2015,93(3):S101.
- [30] Verma V,Simone CB,Allen PK,et al.Multi-institutional experience of stereotactic ablative radiation therapy for stage I small cell lung cancer [J]. *Int J Radiat Oncol Biol Phys*,2017,97(2):362-371.
- [31] Reymen B, Van Loon J, van Baardwijk A, et al.Total gross tumor volume is an independent prognostic factor in patients treated with selective nodal irradiation for stage I to III small cell lung cancer [J]. *Int J Radiat Oncol Biol Phys*,2013,85(5):1319-1324.
- [32] Van Loon J,De Ruyscher D,Wanders R,et al.Selective nodal irradiation on basis of (18)FDG-PET scans in limited disease small-cell lung cancer:A prospective study [J]. *Int J Radiat Oncol Biol Phys*,2010,77(2):329-336.
- [33] Ciammella P,Timon G,Bruni A,et al.Radiation therapy in small cell lung cancer:A national Italian survey [J]. *Radiol Med*,2018,123(7):554-560.
- [34] De Ruyscher D,Lueza B,Le Pechoux C,et al.Impact of thoracic radiotherapy timing in limited-stage small-cell lung cancer:Usefulness of the individual patient data meta-analysis [J]. *Ann Oncol*,2016,27(10):1818-1828.
- [35] Sun JM,Ahn YC,Choi EK,et al.Phase III trial of concurrent thoracic radiotherapy with either first- or third-cycle chemotherapy for limited-disease small-cell lung cancer [J]. *Ann Oncol*,2013,24(8):2088-2092.
- [36] De Ruyscher D,Pijls-Johannesma M, Vansteenkiste J, et al.Systematic review and meta-analysis of

randomised,controlled trials of the timing of chest radiotherapy in patients with limited-stage,small-cell lung cancer [J] .Ann Oncol,2006,17(4):543-552.

[37] Fried DB,Morris DE,Poole C,et al.Systematic review evaluating the timing of thoracic radiation therapy in combined modality therapy for limited-stage small-cell lung cancer [J] .J Clin Oncol,2004,22(23):4837-4845.

[38] Rudin CM,Ismaila N,Hann CL,et al.Treatment of small-cell lung cancer:American Society of Clinical Oncology Endorsement of the American College of Chest Physicians Guideline [J] .J Clin Oncol,2015,33(34):4106-4111.

[39] Wang P,Liu W,Zhao L,et al.Does the response to induction chemotherapy impact the timing of thoracic radiotherapy for limited-stage small-cell lung cancer [J] ?Thorac Cancer,2015,6(5):605-612.

[40] Li JT.A meta-analysis of early radiotherapy and advanced radiotherapy for limited-stage small cell lung cancer [D] .Tianjin:Tianjin Medical University,2015. [李家腾.局限期小细胞肺癌早期放疗与晚期放疗的meta分析 [D] .天津:天津医科大学, 2015.]

[41] Le Pechoux C,Botticella A,Levy A,et al.Prophylactic cranial irradiation or no prophylactic cranial irradiation in metastatic small cell lung cancer:Is it a relevant question once again [J] ? J Thorac Dis,2017,9(11):4157-4161.

[42] Farrell MJ,Yahya JB,Degnin C,et al.Prophylactic cranial irradiation for limited-stage small-cell lung cancer:Survey of US radiation oncologists on current practice patterns [J] .Clin Lung Cancer,2018,19(4):371-376.

[43] Zhang W,Jiang W,Luan L,et al.Prophylactic cranial irradiation for patients with small-cell lung cancer:A systematic review of the literature with meta-analysis [J] .BMC Cancer,2014,31(14):793.

[44] Takahashi T,Yamanaka T,Seto T,et al.Prophylactic cranial irradiation versus observation in patients with extensive-disease small-cell lung cancer:A multicentre,randomised,open-label,phase 3 trial [J] .Lancet Oncol,2017,18(5):663-671.

[45] Zhu H,Bi Y,Han A,et al.Risk factors for brain metastases in completely resected small cell lung cancer:A retrospective study to identify patients most likely to benefit from prophylactic cranial irradiation [J] .Radiat Oncol,2014,9:216.

[46] Eze C,Roengvoraphoj O,Manapov F.Prophylactic cranial irradiation in resected early-stage small cell lung cancer [J] .Int J Radiat Oncol Biol Phys,2017,98(3):612-614.

[47] Kazda T,Jancalek R,Pospisil P,et al.Why and how to spare the hippocampus during brain radiotherapy:The developing role of hippocampal avoidance in cranial radiotherapy [J] .Radiat Oncol,2014,9:139.

---

**备注/Memo:** 辽宁省自然科学基金资助项目 (编号: 2015020263)

---

更新日期/Last Update: 1900-01-01