

Radiotherapy plays an important role in the comprehensive treatment of lung cancer, approximately two thirds of patients will be received at least one course of radiotherapy throughout their illness. In recent years, the application of radiotherapy is more extensive due to the better dose coverage of tumor targets and protection of normal tissues and organs, which mainly benefited from the rapid progress of radiation and imaging techniques. For patients with early stage non-small cell lung cancer (NSCLC) who are unfit for radical surgery, stereotactic radiotherapy (SBRT) has become the standard of care. Even the patients who were eligible for surgery, SBRT also showed promising outcomes in some retrospective studies. The issue of postoperative radiotherapy (PORT) in patients with resected NSCLC remained controversial since the PORT meta-analysis article was published in 1998. Recent studies showed that modern PORT conferred an additional survival advantage beyond that achieved with adjuvant chemotherapy alone in pathologic N2 patients. In stage IV disease, there were also accumulating evidences indicating that the application of radiotherapy in this setting not only served as a palliative treatment but also had the potential to increase survival, especially for those with limited metastases.

With regard to systemic treatment in NSCLC, significant progress has been made in recent years, including angiogenesis inhibitors, molecular targeting therapies specific for oncogenic drivers and immunotherapies. The applications of these treatments were increased in clinic practice, which produced relatively high response rate and long duration with acceptable toxicity profile. Furthermore, the life expectancy in these patients was significantly prolonged than those in the past with treatment of chemotherapy alone. In this context, radiotherapy, as a local treatment modality, has more space for development and imagination in the area of combination therapies. For example, in local advanced NSCLC with EGFR mutation, the combination of thoracic radiotherapy and oral small-molecule tyrosine kinase inhibitors produced a progression free survival of 27.9 months (RECEL study). Maintain treatment with the PD-L1 inhibitor (durvalumab) in patients with locally advanced NSCLC who have not progressed following concurrent chemoradiotherapy, showed encouraging results; the median progression free survival from randomization was 16.8 months in the randomized phase III trial (PACIFIC). Of interest, in a post hoc analysis of KEYNOTE-001 phase 1 trial, patients with a history of previous radiotherapy showed better clinical activity and got more survival benefits from the treatment of pembrolizumab, albeit most patients in this study (64%) received radiotherapy with a palliative intent. All of those indicated that combination of modern radiotherapy with novel systemic treatment deserves intensive investigation, and further work will be necessary to determine the optimal dose/fractionation, timing of radiation in order to harmonize the synergy effects.

In this book, many challenging clinical scenarios in lung cancer radiotherapy will be discussed, and recommendations based on available data or directions deserved further research will be given, including SBRT in early stage NSCLC, radiotherapy in local advanced NSCLC, cranial irradiation in specific lung cancer, and the combination of radiotherapy with chemotherapy, immunotherapy, targeted therapy and surgery.

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