# Radiotherapy for lung tumors arising after a prior pneumonectomy

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Treatment of patients with lung tumors in the contralateral lung after a prior pneumonectomy is challenging, especially for centrally located lesions. The curative modalities have included surgery, cryoablation, radiofrequency ablation, and radiotherapy (1-5). Unfortunately, available data on curative treatment of lung tumors after pneumonectomy by these modalities are limited to small series and case reports, and the safety and efficacy of these modalities remained unclear (1-5).

With the improvement of technology, stereotactic radiotherapy could be a promising treatment for patients with lung tumors arising after a pneumonectomy. In the article by Dr. Senthi *et al.*, 27 patients received curative radiotherapy for a second primary lung cancer arising post-pneumonectomy (6). Utilizing modern radiotherapy techniques, the authors achieved a median survival of 39 months (95% CI, 33-44 months). The 3-year actuarial risk of local recurrence and regional recurrence was 8% and 10%, respectively, which were comparable with that reported after stereotactic ablation radiotherapy for early stage primary lung cancer. Grade 3 or higher radiation pneumonitis was only noted in three patients (11%). The results are encouraging for patients with this difficult situation.

Because tissue proof of lung tumors was available only in a minority of their patients, the promising results of this study should be interpreted with some caution. The lack of histologic verification in the majority of the patients, however, is fairly reasonable for these single-lung patients owing to a significant risk of life-threatening pneumothorax after transthoracic needle biopsy (range, 20% to 50%) (7-12). Because the results suggest that stereotactic radiotherapy is safe and effective after pneumonectomy, high-risk diagnostic procedures should be avoided, and more emphasis should be placed on obtaining a diagnosis using noninvasive molecular techniques (13,14).

The authors showed that stereotactic radiotherapy is feasible even in patients with compromised cardiopulmonary function or with poor global initiative for chronic obstructive lung disease (GOLD) scores (50% of their patients had GOLD Class 3 or 4 chronic obstructive lung disease). They therefore recommend surveillance for the occurrence of second primary lung cancer in patients who are unfit for any curative surgery. Early diagnosis of a second lung cancer can be very important after pneumonectomy, because the radiation dose to the healthy part of the lung and thus, toxicity, is higher in larger tumors. Currently when treating second primary lung cancers arising post-pneumonectomy, the fractionation schedule should be considered, balancing the risks of central organ toxicity against radiation pneumonitis and utilizing less conformal plans with avoidance sectors.

This article represents the largest series describing clinical outcomes for the curative treatment of second primary lung cancer arising post-pneumonectomy. As prolonged survival can be achieved with modern radiotherapy techniques, the findings reiterate the importance of such follow-up and referral for a radiotherapy opinion. Should radiotherapy be offered, the risk of radiation pneumonitis should be acknowledged and treatment planned accordingly. In conclusion, when a second primary stage I lung cancer arises after previous pneumonectomy, the use of risk-adapted stereotactic radiotherapy is an effective and low-risk treatment even in patients with severe pulmonary dysfunction. Routine surveillance after pneumonectomy and treatment by stereotactic radiotherapy for second tumors should be considered in all such patients.

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