

Radiotherapy for lung cancer treatment

Sir,
Clinical Cancer Investigation Journal (CCIJ) has published few articles on radiation treatment for cancer,^[1-6] and these articles are a good contribution to the literature body in the CCIJ. Radiation therapy (or radiotherapy) has become one of the popular options to treat different types of cancer. Lung cancer is considered to be as one of the leader killer among various types of cancer. External beam radiotherapy is being used at many cancer centers to manage the lung cancer. However, the radiotherapy for the lung cancer can be quite challenging since lung consists the low-density tissue, and there is constant tumor motion as a result of human breathing.

Currently, three-dimensional conformal radiation therapy (3DCRT), intensity-modulated radiation therapy (IMRT), and volumetric modulated arc therapy (VMAT) are used for lung cancer irradiation. All these three techniques use mega-voltage photon beams to deliver the radiation dose to the tumor. One challenge associated with the lung cancer treatment using radiotherapy is the ability to hit the target with precision. If the radiation beam fails to hit the tumor volume, normal lung tissue will most likely get excessive radiation dose. Liu *et al.*^[6] reported that tumor motion can be dependent on the size of the gross target volume, and diaphragm motion. Furthermore, if the tumor motion is large (>1 cm), cancer centers often use motion control techniques such as breath holding.

The literature on radiotherapy of lung cancer often mentions the percentage of lung volume receiving 5 Gy and 20 Gy (V5 and V20, respectively), and the reduction of dose to the lung is more likely prevent patients suffering from pneumonitis. There is also an on-going debate which radiotherapy technique is better at sparing uninvolved lung tissue in the radiation therapy. A review article by Teoh *et al.*^[7] shows that there is no clear indication of VMAT is superior to IMRT, and vice-versa. However, the literature suggests that both the IMRT and VMAT provide superior dosimetric advantages to 3DCRT. In recent years, proton therapy is also being used for the lung cancer treatment.^[8,9] In proton therapy, radiation dose is deposited in a localized region since protons have a finite range in the tissue, whereas the photons in IMRT and VMAT do not stop in the tissue. In one of the most recent articles published by Rana *et al.*,^[8] it was demonstrated that the proton therapy is better than the photon therapy (IMRT and VMAT) in sparing the lung tissue, and this will certainly

benefit lung cancer patients with interstitial pneumonitis. The use of proton therapy for lung cancer treatment seems promising. Further studies will be required to overcome the challenge of reducing the tumor motion during the radiation treatment for lung cancer. It is also recommended to use more accurate dose calculation algorithms to compute the radiation dose in the lung treatment plans.^[10] In conclusion, lung cancer treatment using radiation therapy continues to be one of the popular options for cancer treatment. Clinical trials will provide further confidence in using radiation therapy for lung cancer.

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