

## THE COMPARISON OF LUNG DOSE BETWEEN FIXED-ANGLE IMRT AND TOMOTHERAPY

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***Purpose*** : The purpose of this experiment is to compare the lung dose between fixed-angle IMRT technique and Tomotherapy. We also explore the possibility to lower the lung dose with Tomotherapy.

***Material and Method*** : Eight patients were selected for this study. Five of them only have one primary tumor. The others have one primary tumor with two or three lymph node metastasis. All of them were both planned by fixed gantry angle IMRT technique and Tomotherapy technique. The dose distributions and the mean dose to ipsilateral, contralateral and both normal lungs were evaluated and compared between two plans. For completeness, we also evaluate the lung mean dose for a sternum metastasis patient, a multiple lung metastasis patient and a breast cancer patient between fixed-angle IMRT technique and Tomotherapy technique.

***Result*** : By comparing the isodose plan of eight patients, Tomotherapy group has lowered mean dose to both normal lung (4.0% lower in average, median: -2.5%, range: -0.2% ~ -7.2%, p = 0.006) and to ipsilateral normal lung (7.7% lower in average, median: -7.6%, range: -17.8% ~ -1.0%, p = 0.003). But for the contralateral normal lung, Tomotherapy technique doesn't show the statistically significant superiority than fixed-angle IMRT technique (median: -3.1%, range: -22.3% ~ +63.2%, p = 0.20). For patients with multiple lung metastasis, with sternum metastases and with breast cancer, Tomotherapy can reduce the mean dose for whole normal lung by 27.3%, 3.6% and 10.2% respectively.

***Conclusion and Discussion*** : With carefully planning, the Tomotherapy plan could have the same or lower mean dose of ipsilateral and both normal lungs than fixed-angle IMRT. Tomotherapy may have potential to reduce more mean dose to lung than fixed-angle IMRT. We need further investigation to verify this potential.

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Key words: Tomotherapy, Mean lung dose, IMRT, Lung cancer