

SBRT with Lattice Technique for Bulky Tumors - A Clinical Paradigm Shift

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Abstract

OBJECTIVES: SBRT is a novel way to deliver the highest possible radiation dose to kill the cancer while minimizing exposure to healthy organs. SBRT can achieve comparable local control rate to surgery in selected body sites. The application of SBRT in bulky tumor is clearly limited by the ability to spare adjacent normal tissues from the deleterious effects of radiation. Spatially-fractionated GRID radiotherapy (SFGRT) is a proven effective and safe technique to achieve dramatic clinical responses via delivering high ablative dose safely to partial tumor. Lattice radiation therapy (LRT) is the natural extension of High-dose GRID radiotherapy. SBRT delivered with Lattice technique will resulting in highly heterogeneous dose distributions to ablative dose level within the tumor volume, leaving adjacent and peripheral normal tissue minimally exposed.

METHODS: It would be desirable to initiate clinical trials enrolling patient with bulky tumor burden (size>5cm) treated with SBRT with Lattice technique. Patients will be treated with ablative doses (10-18Gy per fraction in 3-5 fractions) delivered to vertices inside tumor while maintaining the peripheral dose to a range of 2-3 Gy per treatment.

RESULTS: We expect similar or improved local control rates compared to current standard of care with SBRT with Lattice technique. Subsequent phase 1 trials would be able to provide information such as maximal tolerated dose levels and toxicity. It would be desirable to find out if higher BED (150-200) range would be more beneficial for local control. Since high-dose RT directed to partial tumor volumes is known to elicit more robust immune stimulation than RT to total tumor volume, the biological and immunological effects of SBRT with LRT technique could be explored during these studies.

CONCLUSIONS: SBRT with lattice technique for bulky tumors is expected to achieve satisfactory local control rate, it would be particularly effective in re-irradiation cases or patients who have otherwise diminished treatment options. Combination of SBRT with LRT and systemic immunotherapy might synergistically enhance tumor regression.

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Abstract

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