Stereotactic Body Radiation Therapy: QA and Safety Considerations

Stereotactic body radiation therapy (SBRT) is a rapidly emerging therapy that has proven benefits of increased tumor control via tumor radioablation, and the convenience of a hypofractionated course. The risks of treatment complication with SBRT are substantially higher than conventional RT, and employing this modality has generally required incorporating the highest precision delivery and imaging technology available. Currently there are many platforms for providing SBRT spanning from conventional linear accelerators with adapted accessories to highly sophisticated dedicated facilities specifically designed for SBRT procedures. SBRT of well defined extracranial targets in various anatomical locations demands special treatment planning considerations due to limitations of dose calculation algorithms in heterogeneous medium, small field dosimetry, tumor/organ motion, and multiple radiobiological constraints. The QA and Safety Considerations presentation on SBRT will include an overview of the available technology for SBRT with an emphasis on image guidance, Quality Assurance, and clinical implementation of SBRT. The presentation will also include site specific treatment planning techniques with considerations to accuracy of dose calculation algorithms, radiobiological issues, and physics reporting strategies. Safety Considerations for simulation, planning, and delivery of SBRT will be presented in accordance with the established guidelines of the AAPM Task Group 101, and other reported literature from ASTRO and ACR. The presentation will also include an overview of SRT and SBRT misadministration reported, and strategies to prevent their recurrence by adoption of QA techniques, including the use of institutionally designed, patient specific checklists.