

AbstractID: 12082 Title: Establishing a Stereotactic Body Radiation Therapy (SBRT) Clinical Program, Part 1: Physics and Dosimetry

Stereotactic body radiation therapy (SBRT) is a technique in which dose is delivered using either in a single fraction or a hypo-fractionated schedule. The technique is characterized by the use of high doses per fraction, increased spatial accuracy of the radiation delivery, and a rapid fall-off of dose outside the treatment volume. The overall goal is to minimize the direct effects of radiation on the surrounding normal tissue while delivering a dose biologically equivalent (or greater) to several weeks of conventionally fractionated radiation therapy to the treatment volume. The intent of SBRT treatment has been to deliver noninvasive tumor-ablative doses to sharply demarcated lesions so that clinical outcomes comparable to surgery could be achieved without surgical complications. The majority of published clinical data describes the treatment of lung, liver and spinal tumors. The radiobiology of short-course, high-dose-per-fraction regimens suggests that utilizing SBRT, with significant local dose escalation even to curative doses, is feasible. The number of fractions and total doses currently in clinical use varies widely in the literature, typically ranging from 60 Gy delivered in 10 fractions to 30 Gy delivered in a single fraction.

The Physics and Dosimetry section of the session is to advise medical physicists establishing such a program. The presentation will include an overview of the AAPM Task Group No. 101 on recommendations for SBRT, which has been charged with (1) review the literature and identify the range of historical experiences, reported clinical findings and expected outcomes, (2) review the relevant commercial products and associated clinical findings for an assessment of system capabilities and technology limitations, (3) determine required criteria for setting-up and establishing an SBRT facility, including protocols, equipment, resources, and QA procedures, and (4) to develop consistent documentation for prescribing, reporting, and recording SBRT treatment delivery.

Learning Objectives:

1. Present the recommended guidelines on establishing an SBRT clinic as presented in the current version of the AAPM Task Group No. 101.
2. Present the technical issues for clinical implementation of SBRT equipment, space considerations, time and personnel considerations.
3. Review the commercial products commonly employed for SBRT with regard to image guidance, localization devices, patient alignment and verification systems
4. Understand the limitation of some treatment planning systems and dose calculation algorithms as they apply to the highly heterogenous doses within a small target volume typically planned for SBRT.
5. Review the overall quality assurance procedures for systems and patient specific parameters for SBRT deliveries.