Volumetric modulated arc therapy for stereotactic body radiotherapy:
Planning considerations, delivery accuracy and efficiency

ACADEMISCH PROEFSCHRIFT

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door

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Volumetric modulated arc therapy for stereotactic body radiotherapy: Planning considerations, delivery accuracy and efficiency

ACADEMISCH PROEFSCHRIFT ter verkrijging van de graad Doctor aan de Beam Arrangements for Inverse Planned Intensity-Modulated Radiation Therapy. The rules usually applied to beam arrangements for forward planned conformal therapy also apply to inverse planned IMRT beams in general. The beam arrangements that are most useful still depend on the site to be treated and on the geometry of the target volumes and normal tissues. SABR is a new type of radiotherapy. It is also known as stereotactic body radiotherapy. The main one is Cyberknife, which is a type of SABR. Helical tomotherapy and volumetric modulated arc therapy (VMAT) are advanced forms of IMRT. While theoretical consideration of second cancers exists with IMRT (Hall, 2006), this technology has the ability to minimize normal organ exposure to radiation. Clinical Implementation of Volumetric Modulated Arc Therapy UT M.D. Anderson Cancer Center Ramaswamy Sadagopan, Rebecca M. Howell, Weiliang Du and Peter Balter. 2. Definition 2 Intensity Modulated Arc therapy where the following three parameters are modulated simultaneously: Gantry rotation, Dose rate, Leaf speed.

Overview 3 Advantages of Modulated Arc Therapy Configuring the Accelerator / R & V system Treatment Planning System commissioning Patient specific QA (film and ion-chamber) RPC phantom and partial treatments verifications Routine QA (output @ dose rates, DMLC QA, linearity check at several dose rates, constancy check). Interlock will not affect the accuracy of dose delivered to the patient. To date, this goal may be obtained by combining two fundamental technological advances: stereotactic body radiotherapy (SBRT), known as stereotactic body radiosurgery (SRS) when administered in a single fraction (5,6) and intensity modulated radiotherapy with volumetric arc technique known with the acronym of VMAT. Briefly, SBRT couples a high degree of anatomic targeting accuracy and reproducibility with very high doses of precisely delivered radiation, thereby maximizing the cell killing effect on the target(s) while minimizing radiation-related injury in adjacent normal tissues (7). Few exp