AbstractID: 12084 Title: Practical Aspects of Cyberknife Small Field Dosimetry

Small field dosimetry for Cyberknife is the most challenging aspects of machine commissioning and annual QA. Accurate reference dosimetry, relative output factors, TPR and OCR data form the baseline for accurate dose delivery. This presentation will give practical guidance on ways to achieve an accurate dosimetric measurement in a time-efficient way.

First, a new reference dosimetry concept based on a recent publication by the IAEA Working group on "Small Field Dosimetry" will be introduced. This new concept explains how to approach reference dosimetry for radiation therapy machines which do not have a 10 cm x 10 cm field as required by TG51 or IAEA Report 398. Using an example, it will be explained how to calculate k_Q for the 60 mm collimator. Suitable detectors for the reference dosimetry with the 60 mm collimator will be discussed. This will include a review of the measured dose dependency on chamber length for the non-flattened field of Cyberknife based on recently published literature. A discussion on reference dosimetry for the IRIS collimator will conclude reference dosimetry.

Second, relative output factor measurements, focusing on collimators ≤ 10 mm, will be introduced. The importance of checking the detector for correct inverse-square law will be shown with a clinical example. Suitable detectors for output measurements are different from detectors used for reference dosimetry. Special consideration will be given to IRIS collimator output factors and their dependency on the accuracy of the mechanical field size tolerance.

This presentation will end with a section on measurements of the TPR and OCR data. Especially measuring OCR data for the IRIS collimator, which require 15 degree and 105 degree scans in addition to the in-plane and cross-plane scans, will be discussed. Data processing as well as tips & tricks to streamline the process will be given. Quality assurance and secondary dose verification processes as applicable to the dosimetry will be covered.

Learning Objectives:
1. Understanding the new IAEA "Small Field Dosimetry" Paradigm on reference field dosimetry.
2. Understanding which detector types are suitable for Cyberknife small field dosimetry, and why.
3. Understanding Cyberknife-specific challenges.