

AbstractID: 2098 Title: IMRT Quality Assurance Using Thebes II, Linear Ion-Chamber Array

Intensity modulated radiotherapy is a complex process and requires extensive quality assurance (QA). IMRT QA is often conducted using radiographic film to validate the dose distribution shape and position and one or more ion-chambers for absolute dosimetry. A technique that can simultaneously provide both position and absolute dose verification is desirable. In this paper we explored the possibility of utilizing the Victoreen Thebes-II, a linear array of ion-chambers. The Thebes-II, Model 7020, has 47 open air ionization chambers on a 0.5cm pitch. These chambers were tested for their leakage, energy dependence, dose-rate dependence, and consistency and found to be acceptable for IMRT measurements. Each chamber was calibrated individually to yield absolute dose after temperature and pressure corrections. The Thebes-II showed significant angular dependence, particularly when the beam was entered from below and the sides. Angular dependence correction factors were measured as a function of beam entry angle and used to correct the measured readings. The angular dependence was verified by measuring doses from open beams. Two IMRT plans were measured using this device and found to be in agreement with the treatment planning system within 3% in the high dose region, consistent with the clinical QA. While film QA yields more information in a single measurement than this system, it is tedious. The advantage of this device is that it provides simultaneous measurements in real time of several points and can be used for composite dose distribution verification. These characteristics make the Thebes-II very useful for routine IMRT QA.