

AbstractID: 2771 Title: Dosimetric IMRT plan verification and daily quality assurance with a two-dimensional ionization chamber array

Purpose: IMRT requires a more specified quality assurance program than the conventional techniques. In this work we present our solution for a full IMRT quality assurance program with two-dimensional ionization chamber arrays (2D-ARRAY, PTW-Freiburg) containing daily checks and individual dosimetric plan verifications.

Method and Materials: The used array (type 10024) has 27 x 27 ionization chambers arranged in a plane, with an entrance window of 5 mm x 5 mm each. The centers of the 729 single chambers are positioned at 10 mm distance from each other.

Results: Our quality assurance program is divided into two parts: On a daily basis, as a morning check, the dose at the central axis, the flatness and symmetry as well as the MLC calibration and light/radiation field congruence are evaluated by a single measurement. For a patient specific IMRT plan verification, the calculated dose distribution of the patient is exported to a CT containing the phantom set-up with the 2D-ARRAY. The corresponding IMRT sequence is exported to the linear accelerator. The values calculated for the plane of the 2D-ARRAY and the values measured with it are then compared.

Conclusion: The daily QA program has been extensively tested. All important field parameters can be obtained in a single measurement per energy. Furthermore MLC misalignments can be detected with an accuracy of less than 1.0 mm, allowing an early warning for a necessary MLC recalibration.

The described program for IMRT plan verification has been proved to be very useful for an easy and fast pre-treatment quality assurance. The error detection capabilities will be discussed in detail and shown to be sufficient for standard IMRT plans.

Conflict of Interest: This work was performed in collaboration with PTW-Freiburg Dr. Pynchau GmbH, Freiburg, Germany.