AbstractID: 3534 Title: Linac QA Using a Computed Radiography System

Purpose: The computed radiography (CR) is replacing film for linac quality assurance (QA) checks in our clinic. A few tools and methods were developed to facilitate this transition.

Method, Materials and Results: A right-triangular prism phantom was used for electron beam quality verification. The phantom was centered along the beam axis, and placed on top of a CR cassette with 110 cm source to image distance (SID). The image was processed to obtain a percentage exposure vs. wedge thickness curve, which was sensitive to electron energy changes. This method demonstrated good reproducibility.

A method using a diamond-shaped template for the light and radiation field congruence test had been previously developed. This method was analyzed and modified. In the modified version, the template was put right above the CR cassette to reduce the systematic error due to the penumbra effect. An IDL program was developed to compute the discrepancies between the light field and the radiation field.

The jaw alignment was checked with a device similar to that of Lutz et al: a CR cassette sandwiched between two pairs of L-shaped Cerrobend blocks. Each pair was embedded diagonally in a piece of foam. The pair above the cassette was at an angle of 90 degrees to the pair beneath the cassette. The radiation was delivered at collimator angles of 0 and 90 degrees to verify the x-jaw and y-jaw alignment, respectively. For each collimator angle, two gantry rotations - 0 and 180 degrees - were used, with equal monitor units delivered at an SID of 100 cm.

The radiation field flatness, symmetry and penumbra were tested using CR combined with the RIT software solution. The results were consistent with those collected using films.

Conclusions: QA checks using CR systems are more convenient and yield results comparable to those from film.