AbstractID: 4383 Title: Geometric and Inhomogeneity Corrections of In Vivo Dosimetry

Purpose:

In vivo dosimetry, the important QA procedure suggested by the ESTRO, requires geometric and homogeneity symmetries. However, these criteria may not be satisfied in clinical measurements. The present study provides a solution for *in vivo* dosimetry under asymmetrical conditions

Materials and methods:

Two asymmetrical conditions are considered. These are the asymmetry of tissue materials and densities and the asymmetry of anatomic structures. We used Styrofoam and commercial bone tissue to simulate, respectively, lung and bone tissues and to assess the effect of tissue asymmetry. To study the effect of geometrical asymmetry, we shifted the plastic water phantom several centimeters off axis. The entrance and exit doses were measured by diodes, and the central axis dose was thus derived. These results are compared to experimental data measured using the ionization chamber.

Results:

The effect of geometrical asymmetry is more important than that of tissue asymmetry. The dose perturbation is 2% if we insert 2 cm Styrofoam or bone on one side of the phantom. But this perturbation increases to 3-5% in the central axis dose if we shift the central axis of the plastic water phantom by 2 cm. However, these perturbations can be reduced to less than 1% after asymmetric corrections.

Conclusion:

The tissue asymmetry causes less dose perturbation compared to that of the geometry asymmetry. Both asymmetries can be corrected as demonstrated in the present study.