

AbstractID: 2532 Title: Analysis of Systematic Uncertainty in Vivo Dosimetry Using Diodes

Purpose:

This study analyzes systematic uncertainty of in vivo dosimetry using diodes. Several possible sources of error are investigated to eliminate or correct systematic errors.

Method and Materials:

Two diodes are placed on both sides of a phantom/patient to measure entrance and exit doses. The midline dose can thus be derived from these entrance and exit doses. We selected patients with tumors in their midline and with geometrically symmetric structures. Several experiments are specially designed to measure response variation of diodes (1) due to temperature change, (2) with/without mask presence, (3) with different types of tapes used to fix the diodes, (4) with the space between mask and skin, (5) with the off field edge distance, and (6) with inhomogeneity of the patients.

Results:

The systematic uncertainty for measurement with/without the mask is 1%. The systematic uncertainty for temperature change is 3~4%. The systematic uncertainty from different types of tapes is 1%. The systematic uncertainty due to space between the mask and the skin is less than 2%. If the diodes were placed off edge for distances greater than one-fourth of the field size, the systematic uncertainty is less than 2%.

Conclusion:

Temperature change may be an important source of error for in vivo dosimetry using diodes. Other sources of error we investigated produced uncertainties less than 2 %.