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Abstracts



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EPR/alanine dosimetry for verification in Helical Tomotherapy Stereotactic Radiosurgery (HT SRS) treatments

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Introduction

Intracranial stereotactic radiosurgery (SRS) is a technique to deliver an ablative radiation dose with an extremely sharp dose gradient to small brain tumors. In this study the accuracy of the dose delivered in SRS by a non conventional radiotherapy machine, the TomoTherapy Hi-Art System, was investigated using an "end-to-end" test using alanine pellets and gafchromic films.

Methods

Dose verifications were made using alanine dosimeters placed in an antropomorphic head phantom (Alderson Rando Phantom) under different treatment conditions in case of both single and multiple brain tumors. 1.25mm slice kVCT scan of the phantom was used to generate SRS plans on the TomoTherapy Planning Station platform. Commercial alanine dosimeters (Synergy Health, Germany) were irradiated in various positions of the phantom. EPR measurements were carried out through Bruker spectrometer at room temperature.

Results

The dose values for 6 different possible clinical scenarios characterized by the presence of one, two or three tumor lesions were reconstructed by means of alanine dosimeters and gafchromic films. The dose values measured through both experimental techniques show a good agreement with the dose values calculated by the TomoTherapy Treatment Planning System, for both tumors and organs at risk (such as optical chiasma and brain stem).

Conclusion

Alanine absolute dose measurements showed to be useful for the dosimetric validation of HT SRS treatments.

References

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