Original research article

Comparison of dose distribution in IMRT and RapidArc technique in prostate radiotherapy

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Abstract

Aim

The aim was to provide a dosimetric comparison between IMRT and RapidArc treatment plans with RPI index with simultaneous comparison of the treatment delivery time.

Background

IMRT and RapidArc provide highly conformal dose distribution with good sparing of normal tissues. However, a complex spatial dosimetry of IMRT and RapidArc plans hampers the evaluation and comparison between plans calculated for the two modalities. RPI was used in this paper for treatment plan comparisons. The duration of the therapeutic session in RapidArc is reported to be shorter in comparison to therapeutic time of the other dynamic techniques. For this reasons, total treatment delivery time in both techniques was compared and discussed.

Materials and methods

15 patients with prostate carcinoma were randomly selected for the analysis. Two competitive treatment plans using respectively the IMRT and RapidArc techniques were computed for each patient in Eclipse planning system v. 8.6.15. RPIwin® application was used for RPI calculations for each treatment plan.

Additionally, total treatment time was compared between IMRT and RapidArc plans. Total treatment time was a sum of monitor units (MU) for each treated field.

Results

The mean values of the RPI indices were insignificantly higher for IMRT plans in comparison to rotational therapy. Comparison of the mean numbers of monitor units confirmed that the use of rotational technique instead of conventional static field IMRT can significantly reduce the treatment time.

Conclusion

Analysis presented in this paper, demonstrated that RapidArc can compete with the IMRT technique in the field of treatment plan dosimetry reducing the time required for dose delivery.

Keywords

IMRT; Arc therapy; Quality indices; Treatment plan comparisons