Implementing RapidArc on the Novalis Tx

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Introduction

With the Novalis Tx (Varian Medical Systems and BrainLAB) high-precision radiation delivery is combined with high-precision imaging. RapidArc (Varian Medical Systems) is a recent method in radiation therapy enabling intensity modulated arc therapy. Several groups performed treatment plan comparisons which demonstrate that the quality of RapidArc based dose distributions is at least as good as for IMRT. In this work, we address the implementation, particularly the commissioning and quality assurance (QA) procedures, of RapidArc on the Novalis Tx.

Material and Methods

The commissioning of RapidArc was based on ARIA 8.6 (Varian Medical Systems) and was pursued according to the procedures of the vendor. Machine related QA is performed by using portal dosimetry and is along with the paper from Ling et al. [1]. Patient specific quality assurance is based on the comparison of measured and calculated dose distributions on a phantom. For this purpose, either the Delta4 system (Scandidos) or portal dosimetry are used. Additionally, we extended our Swiss Monte Carlo Plan (SMCP) [2] in order to manage also RapidArc treatment plans.

Results

The use of an electronic portal imaging device for machine and patient specific QA minimizes the efforts for QA. Patient specific QA using the Delta4 system demonstrates that RapidArc is not only efficient but also an accurate treatment modality. Monte Carlo based QA is performed for dedicated treatment plans. It is worth to note that due to its statistical nature, Monte Carlo calculation is more efficient for RapidArc treatments than for IMRT or 3DCRT.

Conclusion

Clinical implementation of RapidArc on the Novalis Tx was successfully realized. QA procedures were conducted by comparing dose measurements with corresponding calculations. Results from Monte Carlo based QA are very promising and will hopefully replace the measurement based patient specific QA in the future.

References

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