

How sensitive is the collapsed plan?

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Introduction

Epiqa is software that converts an EPID integrated images into planar dose distributions using the principle of the GLAaS algorithm [1]. The software can be utilised also for the verification of RapidArc fields. During irradiation of a RapidArc field, EPID follows the gantry motion and therefore the gantry appears to be static in respect to the detector. Planar dose distribution captured by EPID during RapidArc plan delivery has a specific character and cannot be related to any plane in a patient's body. We refer to it as the "collapsed" RapidArc dose distribution

The presented theoretical study tries to demonstrate the sensitivity of the *collapsed dose distribution* to errors introduced into real clinical patient plans and compares it to the changes in *patient dose distribution*.

Materials and methods

For three qualitatively different clinical RA plans with (prostate, oesophagus, skull) the *patient* and the *collapsed* dose distribution has been calculated in Eclipse using AAA 8.2.23 with calculation grid of 2.5 mm.

The plans were exported from treatment planning system and their leaf aperture and dose meterset have been altered on the level of control points. The modified plans have been imported back to the TPS and the *patient* and the *collapsed* dose have been recalculated.

The original and modified *patient dose distributions* have been compared in coronal, transversal, and sagittal plane in terms of relative local dose changes. In the same fashion, the *collapsed dose distributions* of the original and modified plan have been compared.

Results

The changes introduced into the investigated plans had an influence on the *patient dose distribution* as well as the *collapsed dose distribution*. The qualitative evaluation (frequency histograms) reveals that the *collapsed* dose distribution was more sensitive to the given type of introduced changes.

References

[1] Nicolini G.; Vanetti E.; Clivio A.; Fogliata A.; Korreman S.; Bocanek J.; Cozzi L. The GLAaS algorithm for portal dosimetry and quality assurance of RapidArc, an intensity modulated rotational therapy, Rad. Oncol. 3 (2008) 24.