Pre-treatment verification of RapidArc treatment plans: comparison between Epiqa and Seven29 2D ion chamber array with Octavius phantom

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Introduction
The purpose of this study was to compare two quality assurance methods for verification of RapidArc treatment plans. The first method verified the dose distribution in two orthogonal planes using a 2D chamber array Seven29 (PTW, Freiburg) combined with dedicated octagonal Octavius phantom (PTW, Freiburg). The second method was a verification of the "collapsed" dose distribution derived from EPID integrated images.

Materials and methods
In order to measure the collapsed dose distribution, an integrated image was acquired with EPID positioned in the isocenter for 20 clinical RapidArc treatment plans. Using Epiqa (Epidos), a commercial solution of GLAaS algorithm, the acquired images were converted into dosemaps. The same treatment plans were also used for the irradiation of the tandem 2D array + phantom, with horizontally and vertically oriented 2D array.
All three planar measurements were compared with the reference dose distributions calculated in Eclipse using AAA 8.2.23. The gamma score with 3% dose difference and 3 mm distance to agreement criteria was used to express the agreement.

Results and discussion
The collapsed plan based verification shows to be more sensitive than the 2D array based verification, due to its high resolution. In 4 out of 20 investigated patient plans the gamma score of the 2D array verification was poor. The low score was clearly a result of the imperfection of the detector (strong angular dependence for oblique irradiation).