Purpose: Develop a methodology for RapidArc QA using Eletronic Portal Dosimetry Device (EPID)

Methods: The RapidArc delivers intensity-modulated radiation with different monitor units (MUs) at varying dose rates while multileaf collimator (MLC) leaves are continuously moving as the gantry is simultaneously rotating with varying speed. The quality assurance before treatment should be performed to confirm that the accelerator will reproduce what was planned.We developed a technique for using the EPID to quality assurance of RapidArc. This technique consists of converting the original motion of the MLC in a fixed gantry, keeping the MLC movements, monitor units, and fractional doses of each control point as the original plan, which can then be calculated and measured with EPID.
Absolute dose measurements with ionization chamber in a water equivalent phantom were performed for validation of this technique. For planar dose distribution two comparisons were performed using as reference the gamma function (3 % / 2 mm): EPID (static field x original arc) and static field (EPID x Matrix - IBA). We evaluated the dependence of the EPID response with dose rate and with the moving gantry.
Our score to approve are gamma maximum less than 3 and gamma area with value greater than 1 is less then 5%. For absolute dosimetry the score is below 3%.

Results: After analyzing 120 cases, the maximum gamma was 2,8 and the mean value 1,6 and for gamma area, the maximum gamma was 4,2%. For absolute dosimetry all plans were below 3%. Was also observed that these values of gamma maximum accured in tongue-and-groove region, showing that the planning system is not properly modeled this effect.

Conclusions: After analyzing 120 cases, the results show this methodology is appropriate for quality control of RapidArc plans.