Evaluation of transit in vivo dosimetry using portal imaging in VMAT treatment plans

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Objective

With the new version of the EPIgray™ software, in vivo transit dosimetry with portal imaging (aSi1000) can be used for Volumetric Modulated Arctherapy (VMAT) treatments from the dose reconstruction in the patient with images acquired continuous mode during the treatment.

The aim of this study is to assess the performance of the EPIgray™ software in the field of in vivo dosimetry of VMAT treatment plans.

Material and Methods

1. Reproducibility test on water equivalent phantom

- Eclipse TPS dose prediction
- Transfer to EPIgray®
- Creation of 6 random points in 95% isodose
- Image acquisitions on 10 days with phantom
- Transfer to EPIgray®
- Analyze parameters
- Mean deviation between Eclipse TPS dose prediction and measured dose with portal imaging

2. Reproducibility test on patients with prostate treatment plans

- Eclipse treatment planning
- Transfer to EPIgray®
- Creation of 6 random points in 95% isodose
- Image acquisitions on 30 sessions with patient
- Transfer to EPIgray®
- Analyze parameters
- Mean error between repeated measurements

Results

Reproducibility Tests

- Results with Phantom
- Results with patient

First results for prostate treatments

- First results for 33 patients treated for prostate cancer
  - Mean deviation: -3.37 ± 2.71%
  - 18% of patients didn’t respect the 5% tolerance (Inca criteria)

Conclusion

EPIgray™ provides reproducible and satisfying results on phantom and for « simple » treatments such as RapidArc prostate treatment.