Volumetric Modulated ArcTherapy allows achieving a very high degree of conformation to the target volume, while protecting organs at risks and decreasing time of irradiation by a factor two or three compared to IMRT. We report results of our quality assurance process for head and neck, prostate and SBRT treatments.

Since May 2010, 1000 patients have benefited from the VMAT technique (VARIAN®). Patient specific QA was performed for each treatment:

- Absolute dose measurements in water equivalent phantom.
- Comparison of dose distributions calculated by Eclipse (AAA_10.0.28, grid 2mm, VARIAN®) with that measured by portal dosimetry using the EPIQA 2.1 (EPIDOS®) software.
- Comparison of Eclipse® calculations with the IMSureQA® V3.3 (Standard Imaging®) independent calculation algorithm.

Absolute dose calculations agreed with measurements within -0.42±1.68, -0.24±4.18, -0.8±5.2, for head and neck tumors (400 patients), prostate cancers (571 patients) and stereotactic treatments (29 patients), respectively (Figure 1).

Absolute dose differences between Eclipse® and IMSure® calculations were 2.27±3.12, 1.34±6.47 and 2.2±4, respectively (Figure 2).

Regarding the comparisons of planar doses between Eclipse® and EPIQA®, the number of points passing a 3%/3mm gamma analysis were 98.8±1.32, 98.3±1.55, 99±1.4, respectively (Figure 3).

The analysis of the VMAT QA process performed over a clinical database of 1,000 patients was satisfactory, with results comparable with that of conventional IMRT. The EPID and IMSureQA® tools were proven to be suitable for routine clinical treatment plan QA.