AbstractID: 9303 Title: Quality assurance for IMRT in Belgium: verification of the integral delivered dose with alanine-ESR dosimetry.

Purpose:
To face IMRT treatments with confidence, a federal QA program is set up in Belgium to verify the integral delivered dose for the routine technique as it is applied in the individual centers. The measured dose is compared to the TPS calculated dose as stated by the participant.

Method and Materials:
The integral IMRT-delivered dose is measured at 3 locations within a phantom: at the center of two CTV's and at the center of one OAR in between. Dose is measured with alanine detectors which are read out in a desk top ESR-spectrometer. Alanine dosimetry shows a linear variation with dose, no energy dependence nor fading. Dose is measured as the intensity of the central line in the powder absorption spectrum of alanine. The alanine pellets are calibrated in terms of "dose to water" between 1 Gy and 50 Gy by irradiation in a Co-60 beam against water The participants are asked to pass the phantom through their routine process in order to perform a "end-to-end-test": acquiring CT scans for imaging, defining 2 cylindrical CTV's and one OAR as well to outline the detector volume. Complete freedom is given to the local staff in making a treatment plan: number of beams, optimization criteria, constraints, irradiation mode…). The only restriction is to deliver 10 Gy at the two CTV's and 3 Gy to the OAR. Finally the phantom is placed and lined up on the treatment couch using the routine procedure and irradiated.

Results:
up to now 6 centers are visited for which 10 tests with different IMRT techniques were performed: Tomotherapy(5), Segmented MLC(4), Dynamic MLC(1). The mean value of the ratio between stated and measured dose for CTV1 is 0.989 (sd=0.024); for CTV2 0.992 (sd=0.019); and 0.958 (sd=0.092) for OAR.