Our adjusted correlation factor is:

To obtain the calibrated image, the PVI is divided by this factor, converted into ODrI, divided by ODbI and finally DCC is applied.

Conclusions: This method was applied for several beam configurations placing EBZ films in different phantoms. Dose planes obtained were compared to equivalent measures obtained with PTW 2D-ARRAY seven29 and to calculated data from CMS XIO TPS. PTW Verisoft was used to calculate Gamma2D planes and in all cases the gamma index (3%, 3 mm) was below 1 for at least 95% of points. There is also a good agreement between the absolute doses measured at different points of the film with measurements made with IC. Differences are less than 3%.

Ref. (1) A. Micke, D. Lewis and X. Yu, 'Multichannel film dosimetry with agreement between the absolute doses measured at different points (3%, 3 mm) was below 1 for at least 95% of points. There is also a good agreement between the absolute doses measured at different points of the film with measurements made with IC. Differences are less than 3%.

Purpose/Objective: Pre-treatment verification of radiation plans is an important part of the quality assurance program. None of advanced treatment techniques could be applied without the guarantee that the delivered dose is coincident with the planning dose at a level of the IAEA recommendations. This analysis can be performed by the means of the electronic portal imaging device (EPID). The method of the 3D dosimetric verification of the volumetric-modulated arc therapy (VMAT) plans based on EPID was studied.

Materials and Methods: It was investigated about 50 radiation treatment plans for the SBRT patients with non-small cell lung cancer (NSCLC), pulmonary metastasis, prostate cancer, head-and-neck tumors and brain lesions, which were treated in the Centre for Stereotactic Radiotherapy and Radiosurgery in Novosibirsk Research Institute for Circulation Pathology. During a complete treatment simulation at the linac the portal dose images (PDI) were received for each patient field and compared with the planned PDIs. 3D dosimetric verification was performed for all patient plans calculated according with the volumetric-modulated arc therapy (VMAT). The procedure fulfilled using the ViewGT electronic portal imaging device (EPID) and Dosimetry Check software. The plans were verified by comparison the isodose lines, 2D profiles, dose volume histograms and γ-analysis. Results: The planned and reconstructed dose distributions showed good agreement for pre-treatment verification of the VMAT plans. The average planned and measured isocentre dose difference was 1.20% (range 0.07-2.56%). 3D γ-analysis revealed Γ(3%, 3 mm) = 0.28 for lung metastasis, 0.32 for lung SBRT, 0.33 for prostate, 0.33 for brain lesions and 0.39 for head-and-neck tumors. The passing criteria for the treatment plans was established for the head-and-neck tumors with P1 = 90% (γ ≤ 1) and within P2 = 95% (γ ≤ 1) for other considered localizations.

Conclusions: Verification method on the base of electronic portal imaging device has been successfully implemented. EPID can be used for the high accuracy, high resolution and fast routine pre-treatment verification of VMAT treatment plans.

EP-1162 Validation of a pre treatment specific patient QA method for Cyberknife E. Rondi1, S. Vigorito1, A. Bazani1, E. Mastella1, S. Russo1, G. Piperno2, A. Ferrari2, D. Rozza2, F. Castellini2, R. Orecchia3
1European Institute of Oncology, Medical Physics, Milan, Italy
2European Institute of Oncology, Radiotherapy, Milan, Italy

Purpose/Objective: The purpose of this study was to evaluate an absolute pre-treatment verification method for Cyberknife therapy with a PinPoint ionization chamber and radiographic EBZ films.

Materials and Methods: The CT scan of the Easy cube Phantom was acquired with the clinical parameters used for Cyberknife patients; the PinPoint ionization chamber and radiographic film were positioned in the centre of the phantom. Eight fiducial markers were previously inserted into the phantom for treatment set-up. A fiducial tracking method was used for template QA plan: the patient’s plan was recalculated on the Easy Cube phantom and centred in the sensitive volume of the Pin Point ionization chamber. The dose was calculated with Ray-Tracking algorithm. The radiochromic films were properly calibrated with a 6 MV linear accelerator (Clinac 600, Varian), delivering dose from 0 Gy to 10 Gy with 12 dose points. A total of 137 patients were evaluated: 91 patients with the PinPoint chamber only and 46 patients with PinPoint chamber and radiographic film.

Absolute dose measured with the PinPoint chamber was compared with the mean dose calculated in the sensitive volume of the chamber from the treatment planning system. The radiographic films were scanned using a Epson 1000XL. In transmission mode, 48 bit colour and resolution of 72 dpi. For each patient, calculated and measured axial planar dose distribution was compared with the Gamma Analysis Method (3% dose difference and 3 mm distance to agreement criteria) performed by the VeriSoft Program (PTW).

Results: The percentage differences between calculated and measured PinPoint absolute dose ranges from -7.2 to 9.1 with a mean value of 4.8±1.1, resulting to be below 5% in the 73.9% of cases. The percentage of patients passing the gamma analysis (90% of pixels exceeding a 3% and 3 mm threshold) was 84.8%.

Conclusions: The results obtained with PinPoint measurements show a good agreement between calculated and measured absolute dose. Preliminary results calculated with radiographic films show some critical aspects. Further investigations regarding the possible employment of a 2D-array are required in order to perform the comparison between calculated and measured axial planar dose distribution with the possibility to speed up the procedures of QA program.

EP-1163 In vivo verification of IMRT delivery using a transmission detector, not requiring pre-treatment time on a linac D. Johnson1, V. Cosgrove1, S. Weston1, D.I. Thwaites2
1St James Institute of Oncology, Department of Medical Physics, Leeds, United Kingdom
2University of Sydney, Institute of Medical Physics School of Physics, Sydney, Australia

Purpose/Objective: The DAVID is an optically-transparent, transmission-style detector composed of two sheets of Perspex enmeshed within a gap. The gap contains a series of collection wires running in the direction of the MLC leaf movement; each wire is held at a potential and is aligned with an individual MLC leaf pair. The signal generated at each wire is proportional to the radiation fluence through its associated leaf pair; with additional components from adjacent leaf apertures, due to scatter inside the Perspex. The current paradigm for using the DAVID, as an in-vivo device, is to record a DAVID signal during the pre-treatment verification of treatment delivery to a phantom; should the treatment pass the verification, the DAVID signal will be used as a baseline to compare the subsequent in-vivo responses for each treatment fraction. A new procedure has been suggested, where the treatment is verified using independent checking software; if the treatment passes this test, the information held by the independent software is then used to generate a DAVID signal, which can be used as a baseline for the subsequent in-vivo measurements. The independent dose check and generation of a baseline signal for in-vivo measurements provides a safe system that will catch errors in the TPS, plan transfer to the