successfully be used for prevention and treatment of acute radiodermatitis.

EP-1129

Radiotherapy for mucosa-associated lymphoid tissue lymphoma of the ocular adnexa

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Purpose/Objective: Radiotherapy is useful for the treatment of MALT lymphoma of the ocular adnexa and is the first choice for this disease. We investigated the long-term follow-up results of radiotherapy for MALT lymphoma of the ocular adnexa.
Materials and Methods: Twenty-four patients with MALT lymphoma of the ocular adnexa were treated with radiotherapy alone. The disease arose from the conjunctiva in 18 patients (10 with bilateral involvement), and from the retrobulbar space in 6 patients (1 with bilateral involvement). The median follow-up of the surviving patients was 70 months (range, 6-157). The histological diagnoses obtained via an incisional biopsy in all cases were categorized according to the criteria established by the WHO classification. During the staging work-up, gallium scans, computed tomography of the chest and abdomen, and FDG-PET were performed for all patients. Patients with I_{AE} or I_{AE2} disease according to the American Joint Committee on Cancer TNM Classification were treated with radiotherapy alone. Lesions confined to the conjunctiva were treated with a single anterior direct field using a 6-12 MeV electron beam. The entire bulbar and palpebral conjunctiva were treated. Retrobulbar tumors were irradiated with 18 MeV electron or 6-MV X-rays. The clinical target volume was the entire orbital cavity. A median dose per fraction of 2.0Gy (range 1.8-2.5) was administered, with the total dose ranging between30 and 54Gy (median, 38Gy). Lead eye shields were used for radiotherapy of conjunctival lymphoma. Lens protection was not used for radiotherapy of retrobulbar lymphoma except for one patient.
Results: All patients with MALT lymphoma achieved a CR or unconfirmed CR (CRu). Two patients died of other disease. One patient died of lung cancer and another patient died of progressive supranuclear palsy. The 5-and 10-year overall survival rates of all patients with MALT lymphoma were 100% and 90%, respectively. The 5-and 10-year cause-specific survival rates were 100% and 100%, respectively. Seven eye-balls developed delayed toxicity. Four eye-balls with conjunctival lymphoma experienced dry eye syndrome, and four eye-balls developed cataracts. One patient with retrobulbar lymphoma experienced both dry eye syndrome and cataracts. The vision of patients with cataracts was restored by surgery. In seven eye-balls, the radiation dose had been 40Gy or more.
Conclusions: Excellent local control and survival can be achieved for patients with MALT lymphoma of the ocular adnexa using radiotherapy alone. As a dose of more than 30Gy develops dry eye syndrome or cataract, the dose must not exceed 30Gy for safe treatment of MALT lymphoma of the ocular adnexa. At present, based on our study and previous studies, we administer a radiation dose of 30.6Gy with a fraction size of 1.8Gy for MALT lymphoma of ocular adnexa treatment.

ELECTRONIC POSTER: PHYSICS TRACK: BASIC DOSIMETRY AND PHANTOM AND DETECTOR DEVELOPMENTS/CHARACTERISATION

EP-1130

Determination of the effective point of measurement for parallel plate and cylindrical ionization chambers

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Purpose/Objective: The presence of an air filled ionization chamber in a surrounding medium introduces several fluence perturbations in high energy photon and electron beams which have to be accounted for. One of these perturbations, the displacement effect, may be corrected in two different ways: by a correction factor p_{dis} or by the application of the concept of the effective point of measurement (EPOM). The latter means, that the volume averaged ionization within the chamber is not reported to the chambers reference point but to a different point, the so called effective point of measurement.
Materials and Methods: Within this study the EPOM was determined for four different parallel plate and two cylindrical chambers in mega voltage electron beams using Monte Carlo simulations. The positioning of the chambers with this EPOM at the depth of measurement results in a largely depth independent residual perturbation correction.
Results: For all parallel plate chambers the EPOM is independent on the energy of the primary electrons. Whereas for the Advanced Markus chamber the position of the EPOM coincides with the chambers reference point, it is shifted for the other parallel plate chambers several tenths of millimeters downstream the beam direction into the air filled cavity. For the cylindrical chambers there is an increasing shift of the EPOM with increasing electron energy. This shift is in upstream direction, i.e. away from the chambers reference point toward the focus. For the highest electron energy the position of the calculated EPOM is in fairly good agreement with there commendation given in common dosimetry protocols, for the smallest energy the calculated EPOM positions deviates about 30% from this recommendation.
Conclusions: Besides the determination of the EPOM, the residual perturbation correction for all investigated chambers for the whole range of clinical used electron energies was calculated. The application of the proposed effective point of measurement will increase the accuracy of calculating depth dose data from measured depth ionization curves, especially for depth beyond the reference depth.

EP-1131

Octavius 4D 1000 SRS, a new instrument for SBRT VMAT IMRT verification. Commissioning and clinical implementation

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Purpose/Objective: Modulated arc therapy is becoming the common technique to deliver Stereotactic Radiotherapy. A double challenge arises with respect to its verification. Not only a dose plane should be measured but preferably the entire 3D dose distribution. And, since it includes steep gradient regions, this dose distribution should be obtained with a spatial resolution as high as possible. The aim of this study is to commission a new system which facilitates this procedure, and to evaluate the routine use of this new measuring device.
Materials and Methods: Recently, a new approach to the measure of the 3D dose distribution arised with the introduction of the new Octavius 4D system (PTW). It consists of an ion chamber array embedded in a cylindrical phantom. The phantom is connected to an inclinometer that is attached to the gantry, so that the system is capable to rotate following the gantry orientation in such a way that the array is always perpendicular to the beam axis. Dose distribution and gantry angle are registered as a function of time. Provided with a set of percentage depth dose curves, previously measured and introduced in the system software, the system computes the dose distribution for each gantry angle and reconstructs the resulting 3D dose matrix. The system allows several options for the ion chamber array: the well-known 2D-Array seven29; its successor Octavius Detector 729; or the small field dedicated Octavius 1000 SRS array, which was used in this study, with 977 liquid filled, 2.3×2.3×0.5 mm^3 sized ion chambers covering a 11×11 cm^2 area, with a 2.5 mm spacing in the central 5.5×5.5 cm^2 region. The accelerators used were Varian Clinac iX and Varian TrueBeam with MLC 120HD. The TPS was Eclipse (version 10.0). The commissioning measurements consisted of the following tests: (1) Homogeneity of chamber response evaluated as the maximum deviation with respect to the mean for a uniform field; (2) Linearity, evaluated by fitting measured dose versus UM with a linear function; (3) Reproducibility, evaluated as the maximum difference between several measures with respect to the mean, for the same UM value; (4) Leakage current, pre- and post-irradiation; (5) Verification of typical SBRT clinical plans, evaluated by comparing TPS-calculated versus measured dose using 3D gamma index, with 3%, 3 mm criteria.
Results: (1) The homogeneity between chambers was 0.8%. (2) Linearity was found to be excellent, with an r^2 value better than 0.999. (3) The reproducibility was found to be 0.08%. (4) Leakage increases with previously measured dose and shows its largest variation for large fields. For a 10×10 cm^2 field, it ranges from -0.35 cGy/h to 1.18 cGy/h. (5) Verification of typical clinical plans showed a mean pass ratio of 94.6% (range 91.8%-96.4%).
Conclusions: Octavius 4D system together with Octavius 1000 SRS array is an adequate tool in the routine patient-specific QA of SBRT VMAT IMRT treatment plans.