Therefore, we think it reasonable to believe that making your method, using only a smartphone and free software.

Conclusion:

agreement.

Head & Neck and Body, and in both cases we got an accurate corresponding landmarks in the CT and visual confirmation.

available on the market.

much cheaper way than the usually commercial alternatives accuracy of it was measured both using predefined positions, margins of 1-2 mm in AP direction are necessary to compensate for the daily deformity and/or rotation of the prostate/seminal vesicle.

EP-1779

Margins to compensate for deformity of the prostate/seminal vesicle in IGRT using fiducial-markers

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Purpose or Objective: In external beam radiotherapy for prostate cancer, image-guidance using fiducial-markers decrease set-up error and inter-fractional organ-motion error. However, daily deformity and/or rotation of the prostate/seminal vesicle could not be adequately detected by the verification of fiducial-marker position alone. The purpose of this study was to know how many margins should be added to compensate for the daily deformity and/or rotation of the prostate/seminal vesicle in the image-guided radiotherapy using fiducial-markers.

Material and Methods: Three-hundred ten fractions of nine patients with prostate cancer were examined. Patient setup was performed according to the position of two intra-prostate fiducial-markers (first-stage). Thereafter, with considering deformity and/or rotation of the prostate/seminal vesicle, the patient position was moved to the best position to achieve an alignment of contours of the prostate/seminal vesicle on daily cone-beam CT and contours of the clinical target volumes delineated on treatment planning CT (second-stage). Distance of movement in the second-stage was measured.

Results: An alignment in the second-stage was needed in 47 fractions of 310 fractions (15.2%). In 43 fractions (13.9%), movement of 1 mm was needed only in antero-posterior (AP) direction. Movement of 2 mm in AP direction, movement of 1 mm in cranio-caudal (CC) direction, and movement of 1 mm in AP and CC directions were needed in two fractions (0.6%), in one fraction (0.3%), and in one fraction (0.3%), respectively. No fraction needed an alignment in left-right direction.

Conclusion: With regard to image-guided external beam radiotherapy based on intra-prostate fiducial-marker position, margins of 1-2 mm in AP direction are necessary to compensate for the daily deformity and/or rotation of the prostate/seminal vesicle.

EP-1780

Dosimetric impact of isocenter accuracy in CBCT-guided SRS treatment of vestibular schwannomas

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Purpose or Objective: Linac radiation isocenter describes a path while gantry and couch are rotating during the treatment delivery of typical non-coplanar SRS plans. The aim of this study is to investigate the dosimetric impact of this isocenter ‘wobble’ in SRS of a vestibular schwannoma (VS), and to validate the PTV margin used in our clinical practice.

Material and Methods: Five VS cases were enrolled in this study. The PTV was generated in the Eclipse TPS by expanding the CTV by an isotropic 2 mm margin, according to our SRS policy. A SRS non-coplanar plan (“reference plan”) was designed in the Eclipse TPS by using static gantry IMRT technique. Eleven beams (6 MV) from a Varian Clinac equipped with a 120 Millennium MLC were used. Dose of 12.5 Gy (100%) was prescribed to cover 99% of PTV.

For each VS case, eight X-Y-Z shifts generated from “mean ± 1.96 x SD” misalignments reported by E2E tests were simulated in the Eclipse TPS, resulting in eight “shifted plans”. The following metrics were computed for each shifted plan and compared to the reference plan values: i) dose coverage of the CTV (D99%,CTV), ii) maximum dose to brainstem, iii) mean dose to cochlea, and iv) V10Gy, V5Gy and V2.5Gy of the brain (including the PTV).

Results: 1) Isocenter misalignments revealed by E2E tests were (mean ± SD): -0.4 ± 0.7 mm, -0.2 ± 0.5 mm and 0.2 ± 0.4 mm, in the X, Y and Z directions, respectively. Gaussian behavior was observed for each direction (p > 0.05; Shapiro-Wilk test). The probability of having shifts ≥ 2 mm is less than 1% in Lat, AP, and SI directions.

2) Target coverage was assured in the shifted plans; D99%,CTV: 103.1% ± 5.8%.

3) Shifted plans vs. reference ones revealed not statistically different (p > 0.05; Two-tailed Student t-test) in brainstem maximum dose (7.1 ± 3.0 Gy vs. 7.2 ± 3.1 Gy); cochlear mean dose (5.3 ± 4.1 Gy vs. 5.1 ± 4.4 Gy); V10Gy brain (2.3 ± 1.5 cm3 vs. 2.3 ± 1.6 cm3); V5Gy brain (8.6 ± 5.1 cm3 vs. 8.6 ± 5.8 cm3); and V2.5Gy brain (43.4 ± 26.7 cm3 vs. 43.5 ± 30.1 cm3).

Conclusion: The radiation isocenter “wobble” did not increase significantly the doses to brainstem, cochlea and brain.

2) Our study demonstrated that the 2 mm PTV margin used in our clinical practice was adequate for SRS treatment of VS.