

CCHE - Cairo First Implementation of Stereotactic Radiotherapy Using Agility Head Versa HD

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Abstract

Objective: Implementation of Stereotactic radiotherapy (SRT) using Agility head Versa HD and Flattening filter free beams in combination with Cone beam CT and hexapod 6D couch.

Methods: Three Intracranial patients have been treated at children's Cancer Hospital Egypt (CCHE) by SRT. The first patient was referred on 6/2021 with symptomizing hamartoma (20 Gy /3 fractions), the second was suffering from acoustic neuroma (25 Gy / 5 fractions) and the third one was having suprasellar meningioma (25 Gy/5 fractions) . All patients were immobilized using fraxion system (Patient-Specific Intracranial Immobilization) and 1mm CT slices thickness were acquired by Siemens Somatom Definition. MRI simulation was also done in the same fixation position for the three patients. GTV was delineated using the fused simulation CT and MRI, no CTV was drawn but 1-2 mm PTV was added.

Non-coplanar Conformal Dynamic Arc plan was performed for each Patient (CDA) with 6MVFFF and Agility Head (5 mm Mulileaf resolution) by Monaco Treatment Planning System Version 5.11. Plans were Dosimetrically evaluated according to ICRU-91. Patient-Specific Quality assurance was performed using semiflex ion chamber at different positions from treatment isocenter. Translational and rotational deviations were corrected before the treatment session and the position correction was verified by another CBCT before radiation delivery

Results: The plans were optimized and created using 4 non-coplaner Arcs beams (1 full ARC and 3 half ARCs beams). All Targets and Organs At Risk (OARs) met the clinical criteria with ICRU91 and AAPM TG-101. Patient-Specific Quality Assurance were maintained at 3% differences between measured and calculated dose at all tested points, Furthermore the mechanical isocenters of Couch and Gantry recorded ≤ 1 mm . CBCT and Hexapod were showed 2mm translational and 2o rotation positioning maximum deviation and the estimated radiation treatment delivery was 5.5 minutes in average.

Conclusion: Successfully implementation of SRT using built-in Agility head in combination with Fraxion fixation system and Hexapod 6D couch.