AbstractID: 13585 Title: Evaluating dose measurements of rotational treatment techniques.

Purpose:
To implement Rapid Arc® (RA, Varian Medical Systems) for head and neck cancer treatment six planning approaches are evaluated using EBT II (ISP Inc.) dose measurements.

Method and Materials:
Dose delivery of 6 RA approaches and one IMRT-plan are studied. For planning purposes the delineations of the AAPM TG119 mock head and neck case are adapted to an anthropomorphic phantom.

Measurements are simultaneously performed at two different planes. The measuring planes are perpendicular to the rotation axis of the gantry. The measurements are compared with the planned dose using gamma-analysis (3mm dta and 3% dose). The γ-planes are evaluated using their polar representation rather than the carthesian representation. A γ-projection for each control point enables us to evaluate some RapidArc parameters which change during irradiation.

Results:
The measurements on the anthropomorphic phantom have lower agreement scores(AS 82±5%) than our clinical hybrid plan QA (AS 95±3 %) and the γ-planes of the different RA approaches show a remarkable resemblance.
A depth dose measurement parallel to the photon flux excludes a dependency of this orientation of the measurement plane (AS 99%). Electron densities are projected similarly to the projection of the γ-data. Scatter plots exclude a relation between both quantities. Scatter plots of the doserate and the γ-values do not reveal a relation nor does it show a relation between γ and the multileaf collimator (MLC) opening at the level of the measuring plane.

Conclusion:
γ-evaluation of EBT II-dose measurements show significant disagreements for RA plans on an anthropomorphic phantom. To evaluate this a polar projection of γ-data is introduced. Relations between the measurement errors and the orientation of the measuring plane, electron density (-changes), doserate, and MLC opening are excluded.

Conflict of Interest (only if applicable):
Research partly sponsored by Varian Medical Systems, Palo Alto, California, USA.