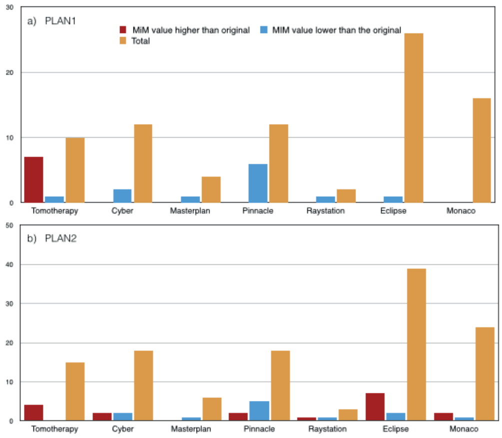

	TPS	Objective not respected	Dmax TPS original	Dmax Recalculated by MIM
PLAN1	Tomotherapy	Cord $V_{21.9Gy}$<0.03cm³ Cord V_{18Gy}<0.35cm³	21.4 Gy 17 Gy	22.2 Gy 19.1 Gy
PLAN1	Tomotheapy	Cord V_{18Gy}<0.35cm³	17.1 Gy	18.3 Gy
PLAN1	Tomotheapy	Cord V_{18Gy}<0.35cm³	17.4 Gy	18.3 Gy
PLAN1	Tomotheapy	Cord V_{18Gy}<0.35cm³	18.0 Gy	19.0 Gy
PLAN2	Eclipse	Esophagus $V_{25.2Gy}$<0.03cm³	25.1Gy	26.4 Gy
PLAN2	Eclipse	Esophagus $V_{25.2Gy}$<0.03cm³	24.9 Gy	25.6 Gy
PLAN2	Eclipse	Esophagus $V_{25.2Gy}$<0.03cm³	25.0 Gy	27.5 Gy

Conclusion

A recalculation with an third part software allowed to outline some OARs constraint violations that were not observed in the original plan. The assessment of the variability present among different commercially available TPS can give some useful indication to the planner, especially in cases where the maximum dose is a crucial parameter for PTV dose coverage optimization.

EP-1981 Clinical delivery of stereotactic radiosurgery using a linac with 5 mm MLC

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Purpose or Objective

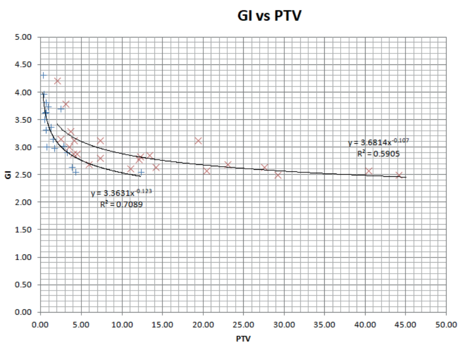
Various articles have discussed the clinical significance of fine (2.5 mm) multileaf collimators (MLC) for stereotactic radiosurgery (SRS) compared to 5 mm MLC. In this study methods of overcoming the limitations of 5 mm MLC linac based SRS were applied. Delivered plans were compared with published planning studies.

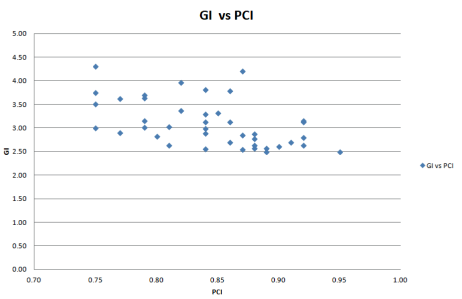
Material and Methods

26 SRS/SRT patients with 43 brain mets (0.25 to 44.09 cc) treated in our radiotherapy centre were analysed. 1 mm margin is added to the GTV for PTV. Prescription doses were 15-24 Gy in 1#, 21-24 Gy in 3# or 25 Gy in 5#. We used Eclipse TPS (v13.7) for Varian (Palo Alto, CA) Clinac iX with millennium MLC (5 mm) and Exactrac imaging system (Brainlab, Munich DE). All plans were created either using dynamic conformal arc (DCA) or VMAT RapidArc (RA) techniques with 6 MV photons and calculated using AAA (v10) on a 1 mm dose grid. Typically using 4 arcs (3-11) and 1-3 non-coplanar couch angles. The effects of size limitation, interleaf leakage and leakage through opposing closed leaves were minimised. Techniques included: isocentre and collimator angle optimisation, out of field junction leaves (for DCA) , and asymmetric jaws to define target shape for better conformity. The minimum jaw size used was 2x2 cm. The plans were evaluated using selectivity (S = PTV $V_{100\%}$/Body $V_{100\%}$), target coverage ratio (TC = PTV $V_{100\%}$/PTV), Paddick conformity index (PCI = S x TC), gradient index (GI = Body $V_{50\%}$/ Body $V_{100\%}$) and normal brain doses. Patient specific QA was performed for all patients using Gafchromic film (EBT 3) and pinpoint chamber (PTW, Freiburg) point dose measurements in a RANDO head phantom. The cumulative measured point dose was compared with Eclipse calculated and gamma analysis for the film was performed for 1mm, 5% and 2mm, 5% criteria.

Results

The mean (± 1 SD) selectivity, target coverage ratio and PCI were 0.85 ± 0.05, 0.99 ± 0.01 and 0.84 ± 0.05 respectively. The mean (± 1 SD) GI was 3.1 ± 0.49. The target coverage was given higher priority than selectivity and PCI was at least 0.75 for all plans. The GI was < 4 for all cases except for 2 cases, one with PTV = 0.25 cc and the other where 2 mets were adjacent. Figure 1 and 2 shows GI vs. PTV and GI vs. PCI respectively. For small PTVs (diameter < 2 cm), DCA produced better GI than RA. For SRS plans, the mean (± 1 SD) normal brain V_{12Gy} = 9.94 ± 4.29 cc. The mean (± 1 SD) percentage variation of measured point dose to Eclipse calculated was -2.71 % ± 2.06%. Mean (± 1 SD) gamma pass percentage for film was 96.2 % ± 3.3 %(1 mm, 5 %) and 99.1% ± 1.4 %(2 mm, 5 %).





Conclusion

SRS/SRT planning using DCA or RA with 5 mm MLC adopting above methods can produce plans of quality similar to Gamma Knife or a Linac with 2.5mm MLC. This was corroborated by results from the recent national SRS QA programme in England. Cases involving complex target/OAR geometry will benefit from RA. For PTVs of diameter < 2 cm DCA is preferable.

EP-1982 How does time affect radiosurgery treatment planning?

J. Fonseca[1], R. Colaço[1], E. Netto[1], G. Fernandez[1], R. Pocinho[1], C. Travancinha[1], M. Labareda[1], L. Carita[1], M. Moreno[1], F. Ribeiro[1], F. Santos[1]
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Purpose or Objective