

AbstractID: 8762 Title: Inverse planned IMRT treatment of the whole CNS

Purpose/Objective: The irradiation of the whole CNS presents a technical challenge, requiring at least one junction due to the large treatment length (>40cm). The conventional solution is to feather/stagger multiple junctions using multiple plans or couch adjustments. This new technique uses *inverse* planned IMRT to increase the PTV conformity, minimise dose to OARs and stagger the junction(s) within a single treatment plan.

Materials/Methods: Patients are CT planned and treated on Elekta 6MV linear accelerators oriented in a supine position. The inverse planning is performed using Pinnacle³ IMRT software utilising step and shoot delivery. The brain is treated using a forward planned IMRT POP, whilst the spine is treated using a 3-field IMRT arrangement. A single plan is developed by optimising the IMRT fields onto an initially generated staggered junction. The IMRT solution then produces a set of segments creating a mirrored junction. Major OARs included in the optimisation are the heart and kidneys. Absolute dose, 2D relative dose maps and verification of the feathered junction is performed prior to treatment.

Results: For the new technique there have been notable improvements in the PTV conformity, with typically a 300 and 400 cm² reduction in the body V90% and V65%, whilst reducing the dose to critical structures such as the heart, liver and kidneys. 2D relative dose maps demonstrate a DTA (4%/4mm) of $\leq 1\%$. Verification of the feathered junction demonstrated that an overlap of up to 1cm results in an increased dose in the junction of $\leq 25\%$ and is therefore robust to patient set-up error.

Conclusion: The IMRT technique improves the dosimetric quality of the plan in terms of conformity and organ at risk doses. It was also found to significantly reduce the time and complexity of planning and delivery compared to conventional techniques.

Conflict of Interest (only if applicable):

None