

Purpose: To study the benefit of non-coplanar beam arrangements vs. coplanar beam arrangements in IMRT treatment for paranasal sinus tumors.

Methods and Materials: Coplanar and non-coplanar IMRT plans prescribed to 63 Gy were generated for 5 patients. The non-coplanar beam arrangements were chosen using BEV tools. Dose distributions and dose volume histograms for each technique were compared to evaluate target coverage and normal tissue doses. Plan requirements for the target included a PTV V95  $\geq 90\%$ , a GTV V95  $\geq 100\%$  and a maximum dose  $\leq 120\%$ . Special effort was made to minimize the dose to both optic pathways. However, if the PTV or GTV overlapped with one of the optic pathways, the clinical decision was to spare only the contralateral pathway.

Results: For PTV's which did not include the retinas or optic nerves, IMRT together with a 6 field non-coplanar beam arrangement increased the PTV V95 to at least 90% and the GTV V95 to 100%. For these patients, the doses to both optic nerves and the chiasm were below 50 Gy, and the maximum retinal dose was less than 45 Gy. The coplanar IMRT beam arrangements resulted in decreased target dose when both optic pathways were spared. For PTV's which did overlap with the optic structures, the target coverage results were similar as long as only the contralateral optic pathway was spared.

Conclusion: Compared to coplanar IMRT beam arrangements, non-coplanar beam arrangements for treating paranasal sinus can increase target coverage while keeping the optic structures below dose limits.