

AbstractID: 3340 Title: Effects of Anatomical Changes Due to Response to IMRT on Radiation Doses to Organs at Risk; A Case Study for Image Guided Adaptive IMRT

**Purpose:** The purpose of this study is to evaluate dose volume histograms of the PTV, and the organs at risk (OAR) during a course of IMRT treatment of a patient with olfactory neuroblastoma. The study will help simulate adaptive IMRT for patients with similar disease

**Method and Materials:** A 46 years old male patient with unresectable right-sided olfactory neuroblastoma with right eye proptosis of about 1.5cm was treated with IMRT using a Brainlab Novalis SRS system. The daily dose was 180cGy to the isocenter for 35 fractions. The initial PTV volume measured to be 108cc. A Brainlab mask system with a daily positional accuracy of 1mm was used to immobilize the patient. The eyes, optic nerves, and chiasm were defined as organs at risk. 8 step and shoot IMRT beams were defined. The CT images of the patient acquired initially, and at fraction 34 were fused, and compared.

**Results:** The gross tumor volume (GTV) decreased during the course of IMRT from 108cc to 38 cc, a 65% reduction in volume. The right eye moved back to its position by 9mm during the IMRT course of treatment, a linear transition of 0.3mm/FX. The maximum dose to the right orbit increased from initial dose of 90cGy/FX to 180cGy/FX at the last fraction. The original planned OAR dose was significantly increased to both the right orbit, as well as the right optic nerve due to tumor shrinkage compared with the start of the treatment.

**Conclusions:** In the absence of image guided adaptive therapy for tumors, which respond rapidly to radiotherapy, more conservative dose limitations may be necessary for the organs at risk. In addition, imaging studies during the course of the treatment would help evaluate, and possibly modify the IMRT plan.