AbstractID: 1227 Title: Single Fraction SRS Treatment with a Non-invasive Head Frame: a Feasibility Study

Stereotactic radioisurgery (SRS) is carried out using a head frame fixed to the skull. The downside of this procedure is that the head frame remains fixed to the patient for several hours until the treatment is delivered. The goal of this study is to explore using a commercial non-invasive relocatable head frame for single fraction SRS. SRS is performed using an MR fused to a CT scan. In this study the planning CT scan was performed after the head frame was placed, and then a second CT scan was taken prior to treatment with a Primatom CT-on-rails (Siemens). The coordinates of three easily visualized anatomical points were compared with Radionics SRS planning system (Tyco Healthcare LP). The uncertainty of the method was determined by comparing CT scans of 7 patients (20 observations) treated with the fixed head frame (BRW). The coordinates should not vary with the fixed head frame and any differences in the x, y, z directions represent the uncertainty of the method. The coordinates of 21 observations (7 scans) for a patient undergoing fractionated treatment with a commercial SRT head frame (GTC) were evaluated. The 3D vector combining the displacement in all three directions was 0.8±0.2 mm using the BRW head frame, and 2.5±0.8 mm using the GTC frame. These results indicate that the GTC head frame has a localization uncertainty on the order of 2 mm. This uncertainty may be eliminated by correcting the shifts when performing single fraction SRS treatments.