

AbstractID: 8153 Title: Clinical Experiences with KV Images for Stereotactic Radiosurgery and Radiotherapy Setup

Purpose: To report our clinical experiences with on-board-imager (OBI) KV images verification for cranial stereotactic radiosurgery (SRS) and fractionated radiotherapy (FSRT) treatments.

Methods and Materials: From 01/ 2007 to 01/2008, 28 patients (34 lesions) were treated with single-fraction SRS immobilized with head frame and 12 patients (15 lesions) were treated with FSRT immobilized with thermoplastic facemask. No additional margin was added to the gross tumor for SRS patients, and a 3mm 3D margin was added to the gross tumor as planning target volume for FSRT patients. After localizing the patient with the target positioner, orthogonal KV images were taken and evaluated using an online 2D-2D match with planning digital reconstructed radiographs before each treatment. Suggested couch vertical, longitudinal and lateral shifts were recorded. KV images were also taken immediately after treatment for 18 SRS patients and on a weekly basis for 6 FSRT patients to assess any intra-fraction changes.

Results: For SRS patients, 34 pre-treatment images were evaluated and the suggested couch shifts were all within 1mm in any direction. Among 18 SRS post-treatment images evaluated, the difference with the pre-treatment images in terms of suggested couch shifts were all within 1mm. 31 times out of 309 FSRT treatment setups, the suggested couch shifts from KV images matches were out of the 3mm tolerance. The mean and standard deviation of suggested couch shifts were: ($0\pm 0.9\text{mm}$, $0.1\pm 1.4\text{mm}$, $0.3\pm 0.8\text{mm}$) in the vertical, longitudinal and lateral directions respectively. Among 28 weekly post-treatment images, except for 4 occasions, the difference with the pre-treatment images in terms of suggested couch shifts were all within 1mm.

Conclusion: KV images are useful for verifying setup for stereotactic treatments. For FSRT, a 3mm margin in all direction is adequate and feasible for routine setup. Intra-fraction changes were non-detectable for SRS treatments and minimal for FSRT treatments.