AbstractID: 13403 Title: Lower spinal cord dosimetric effects of upper field image-guided alignment in split-field IMRT technique

Purpose: To investigate the lower spinal cord dosimetric effects of setup errors in split-field head and neck radiation therapy which persist after upper field daily bone alignment (IGRT) due to body rotation and non-rigid anatomy. **Method and Materials:** Information from twelve patients who underwent daily CT-guided radiation therapy was used to evaluate lower field dosimetric margins. Cumulative dose distributions were calculated by mapping daily dose from IGRT alignment onto the planning CT. Lateral dose profiles were measured across the blocks of the larynx and spinal cord. The profile inflection points marked the dosimetric field edges of the blocks. The midpoint between the field edges of the original plan was defined as the block center. The dose gradients at the field edges were measured and compared with the original plan to indicate penumbra variation. **Results:** Cumulative dose to the lower cord never exceeded 40.5Gy. The average lateral shift of the field edge was 0.6mm (σ =1.7mm; range: -3.0mm to 4.0mm) and 0.4mm (σ =1.6mm; range: -3.5mm to 3.5mm) for the larynx and spinal cord, respectively. The magnitude of the edge gradient increased on average -4.97Gy/mm (σ =4.01Gy/mm; range: -12.1Gy/mm to 1.31Gy/mm) and -0.74Gy/mm (σ =1.43Gy/mm; range: -.59Gy/mm to 3.03Gy/mm) for the larynx and spinal cord, respectively. **Conclusion:** Despite residual setup errors after upper field alignment, the lower field treatment is safe and clinically acceptable. The field edge shift was observed to be as large as 4mm, however the lower cord remained within the dose shadow of the cord block. Motion induced dose smearing was also observed to decrease the steepness of the edge gradient by nearly 5Gy/mm. **Conflicts of Interest:** None.