

AbstractID: 8807 Title: An IMRT planning technique for maintaining tolerable spinal cord dose with unintended field overlaps at the supraclavicular junction plane of head and neck radiotherapy

Purpose: Head and neck cancers can be treated with an upper intensity modulation radiation therapy (IMRT) plan matched with a lower supraclavicular anterior field. A small spinal cord block is traditionally placed in the supraclavicular field to shield to protect the spinal cord from excess dose due to unintended field overlaps. This block can shield targeted tissue. This study describes a method that keeps the cord dose within tolerance and still delivers dose to targeted tissues.

Method and Materials:

Radiotherapy plans were created with 7 coplanar IMRT fields matched to the anterior supraclavicular field. IMRT optimization is then used to reduce the dose to levels that would result in tolerable spinal cord doses when field misalignments occur. A structure, named “cord junction”, was defined as the spinal cord that extends 2.1 cm superiorly and inferiorly to the junction plane. The IMRT plan was optimized junction cord tolerances of 5, 10, 20, and 45 Gy. Each of these plans were then summated with the supraclavicular field with field misalignments of 0, 2, 5, 10 and 20 mm.

Results: As the overlap increases the maximum “junction cord” dose increases. Larger overlaps are tolerable when the junction cord was reduced. The 45 Gy junction cord limit is exceeded for overlaps of 2 mm (junction constraint of 45 Gy), 10 mm (junction constraint of 20 Gy or 10 Gy) and an over 20 mm overlap was tolerable when the cord junction constraint was 5 Gy. The planning target volume (PTV) coverage was maintained for each optimization with D95 values of 98%.

Conclusion: This study has addressed a common concern among clinicians of the need to not shield areas of possible disease yet ensure a safe spinal cord dose in the case of small positional errors in the radiation beam.