

AbstractID: 10148 Title: Dose Sparing of Brainstem and Spinal Cord for Re-irradiating Recurrent Head and Neck Cancer with Intensity Modulated Radiotherapy

Purpose:

Due to the lifetime dose limit for these critical structures such as brainstem and spinal cord, achieving an additional dose of 60 Gy to patients with recurrent head and neck cancer is challenging for who received a previous dose of ~60 Gy. Specifically, previously irradiated head and neck patients may be near tolerance dose to their brainstem and spinal cord. In this study, a reproducible IMRT treatment design is presented to spare the doses to brainstem and spinal cord with no compromise of prescribed dose delivery.

Method and Materials:

Seven patients with previously irradiated, recurrent head-and-neck cancers were treated with DMLC IMRT. The jaws of each field were set fixed with the goal of shielding the brainstem and spinal cord at the sacrifice of partial coverage of the planning target volume (PTV) from any particular beam orientation. Beam geometry was arranged to have sufficient coverage of the PTV and ensure that the constraints of spinal cord <10 Gy and brainstem < 15 Gy were met.

Results:

The mean maximum dose to the brainstem was 12.1 Gy (range: 6.1-17.3 Gy), and the mean maximum dose to spinal cord was 10.4 Gy (range: 8.2- 14.1 Gy). For most cases, 97% of the PTV volume was fully covered by the 95% isodose volume. We found empirically that if the angle of cervical spine curvature (Cobb's angle) was less than ~30 degrees, patients could be treated by 18 fields. Six patients met these criteria and were treated in 25 minutes per fraction. One patient exceeded a 30 degree Cobb's angle and was treated by 31 fields in 45 minutes per fraction.

Conclusion:

We have demonstrated a new technique for re-treatment of head and neck cancers. The angle of cervical spine curvature plays an important role in the efficiency and effectiveness of our approach.