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## An investigation of partial volumetric arc therapy versus 3D conformal radiation therapy for early stage larynx cancer

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Larynx cancer is the one of the most common head and neck malignancy and almost half of these malignancies present at an early stage (T1T2N0). This disease includes several effective treatment modalities; radiation therapy, endoscopic resection, open partial laryngectomy. The goal of any therapy is cure with larynx preservation, high voice quality, and minimal morbidity.

High dose radiation to the carotid arteries can lead to vascular disease. Using conventional techniques can cause carotid artery stenosis and increase the risk of ischemic stroke.

The dose to the planning target volume (PTV) in all patients was 6300cGy in 225cGy per fraction. Target delineation of CTV to PTV margins as low as 0.3 cm have been utilized. The entire spinal cord, the bilateral carotid arteries were contoured as organs at risk (OAR). The plans were normalized such that the PTV and CTV D95 was equal to the prescription dose. 4 patients with partial volumetric arc therapy and 3 patient with 3D conformal therapy were compared. PVMAT plans were planned with 2 arcs between 110 and 250 degrees.

D95 of the PVMAT and 3D plans were 6355, 6300, 6318, 6306cGy and 6302, 6303, 6337 cGy, respectively. The mean right carotid artery dose was 2331, 2642, 2323, 2923cGy and 6230, 6266, 6329 cGy in the PVMAT, 3Dplans, respectively. The mean left carotid artery dose was 1878, 2657, 1883, 3088cGy and 6278, 6316, 6299 cGy in the PVMAT, 3Dplans, respectively. Dmax of spinal cord of the PVMAT and 3D plans were 1209, 2932, 2812, 2136cGy and 1083, 3820, 780 cGy, respectively.

PVMAT seems to have increased OAR sparing with nearly same spinal cord preserving and same tumor coverage. This will help to increase tumor control in head and neck tumors by allowing for dose escalation and better target coverage.

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