

## Use of volumetric modulated arc radiotherapy in patients with early stage glottic cancer

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### ABSTRACT

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**Aims and background.** We compared conformal, intensity-modulated radiotherapy (IMRT) and intensity-modulated arc therapy (IMAT) in early stage glottic cancer in terms of dosimetric features as target coverage, dose to the organs at risk and total treatment time.

**Methods and materials.** Five consecutive T1 glottic squamous cell carcinoma patients were selected for the study. Three-dimensional conformal radiotherapy (3D-CRT), 3-field or 5-field intensity-modulated radiotherapy (3F-IMRT and 5F-IMRT), or IMAT, which was in 2 different forms – a regular IMAT (R-IMAT) and an alternative IMAT (A-IMAT) with an unirradiated section, was planned for each patient. The prescribed dose was 63 Gy in 28 fractions. The minimum dose for 95% of the clinical target volume (D95), maximum dose point at clinical target volume (Dmax), total monitor units, left and right carotid artery doses (V35 and V50 – percentage of volume receiving 35 Gy and 50 Gy), and total treatment time were calculated for each plan.

**Results.** Median D95 values in the 5 plans studied with each technique ranged between 63 and 63.3 Gy ( $P = NS$ ). Median Dmax values for each technique ranged between 65.4 and 70.8 Gy. The number of hot spots with IMRT and IMAT was significantly higher than with 3D-CRT plans. Conformal radiotherapy plans median V35 (93.6%) and V50 (76.6-83.3%) values for carotid arteries were significantly higher than with IMRT and IMAT (2.9%-11.4% and 0.0%). Average treatment times for 3D-CRT, 3F-IMRT, 5F-IMRT, R-IMAT and A-IMAT techniques were calculated as 64, 119, 147, 39 and 32 seconds, respectively.

**Conclusions.** IMAT has significantly decreased the treatment time compared to IMRT and 3D-CRT with acceptable homogeneous clinical target volume coverage and low carotid dose.

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**Key words:** glottic cancer, intensity-modulated radiotherapy, radiotherapy, volumetric arc therapy.

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