J Nucl Med Radiat Ther 2017, 8:4 (suppl)
DOI: 10.4172/2155-9619-C1-012

Dosimetric comparison of volumetric arc therapy and intensity modulated radiotherapy for glioblastoma treatment

Ibrahim Kaptan, Gamze Ugurluer, E Burcin Ispir, Yucel Akdeniz and **Meltem Serin**
Acıbadem University, Turkey

Objective: The aim of this study is to compare volumetric arc therapy (VMAT) and intensity modulated radiotherapy (IMRT) for glioblastoma patient's treatments.

Materials & Methods: In 10 glioblastoma patients who were treated in our radiotherapy clinic, tomography images were scanned with 2 mm slice range and imported treatment planning system (Eclipse Helios v13.6). Target volumes (PTV) and organs at risk (OAR) were drawn in every slices. IMRT and VMAT treatment plans were planned for each patients. Anisotropic Analytical Algorithm (AAA) was used for calculations of the treatment plans. The treatment plans were compared using dose-volume histograms (DVH) about coverage of PTV and protection of OAR. We statistically analyzed the data with SPSS software.

Results: To the VMAT and IMRT techniques; minimum PTV doses (D%98) respectively were found 5913.30±64.22 and 5928.90±90.38 cGy (p>0,05); maximum PTV doses (D%2) 6165.10±40.15 and 6116.30±49.05 cGy (p>0.05); CI (conformity index) values 1.28 and 1.44 (p>0.05); HI (homogenity index) values 1.12 and 1.08 (p>0.05). When the plans compared about coverage of PTV, there was no differance between them. Mean doses were compared to the protection of the organs at risk. Mean doses both VMAT and IMRT respectively were found; maximum brainstem doses 929.4 and 1069.1 cGy; mean brainstem doses 311.3 and 305.9; maximum chiasm doses 922.9 and 953.7 cGy; mean chiasm doses 607.8 and 559.7 cGy; maximum ipsilateral optic nerve doses 447.7 and 669.4 cGy; mean ipsilateral optic nerve doses 347.3 and 486 cGy; maximum contralateral optic nerve doses 422.6 and 399.7 cGy; mean contralateral optic nerve doses 316.3 and 321.5 cGy; maximum ipsilateral eye doses 595.4 and 740.0 cGy; mean ipsilateral eye doses 296 and 379.1 cGy; maximum contralateral eye doses 590.6 and 532.6 cGy; mean contralateral eye dose 290.3 and 295.6 cGy; maximum ipsilateral lens doses 339 and 350.9 cGy; mean ipsilateral lens doses 273.5 and 317.1 cGy; maximum contralateral lens doses 308.4 and 309.9 cGy; mean contralateral doses 249.1 and 281.7 cGy; maximum brain doses 4368.6 and 4394.1 cGy. Statistically, there were no difference between treatment techniques. In spite of that, ipsilateral eye, lens and optic nerve doses in the VMAT plans were lower than IMRT plans. In terms of monitor units (MU), VMAT's total MU was calculated 410.4 MU and IMRT was calculated 466.8 MU. Thus, it was observed that total MU decreased statistically significant in VMAT plans.

Conclusion: Both treatment techniques were similar, when they were compared about coverage of PTV and protection of OAR. However, total MU and ipsilateral organ doses decreased in VMAT plans.

ibrahim.kaptan@acibadem.com.tr