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The Effect of Patient Position on Integral Doses in Patients with Prostate Cancer Treated with Robotic Radiosurgery System

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Abstract

Objectives: The risk of radiation-induced toxicities in neighbouring organs is associated with increased integral and organ at risk doses. In this study, we investigated the relation between patient position and mean integral dose, low dose volumes in patients prostate cancers treated by robotic radiosurgery system.

Methods: The treatment plans of 40 localized prostate cancer patients who were treated with robotic radiosurgery device with SBRT at Medicana International Ankara Hospital between 2014 and 2019 were analyzed retrospectively. In the first group, 21 patients were planned in head first supine (HFS) position and in the second group 19 patients in feet first supine (FFS) position. All prostate volumes were prescribed 36.25Gy in 5 fractions with at least %95 coverage. Dose constraints for bladder were Dmax<38Gy 5cc<37,5Gy, 10cc<37Gy 15cc<18,3Gy and for the rectum Dmax<38Gy, V5%<36,25Gy, V10%<32,625, V20%<29Gy, V50<18,125Gy, 1cc<36Gy, 20cc<25Gy. Mean Integral dose [ID = Mean dose(Gy) x Volume(L)], V3 and V5 values were calculated for two groups of patients. Mean integral dose values were obtained by subtracting tumor volume from the body. The results were evaluated by Mann Whitney-U test.

Results: The mean values of ID, V3 and V5 for HFS and FFS were 59.38 ± 18.49 Gy.L and 50.62 ± 16.36 Gy.L (p = 0.130), 4.99 ± 1.36 L and 4.27 ± 1.15 L (p = 0.105), 3.25 ± 0.9 L and 2.65 ± 0.7 L (p = 0.088), respectively. Although the mean values of integral doses, V3 and V5 values were lower in the FFS position, there was no statistically significant difference.

Conclusions: There is no difference between HFS and FFS position in terms of integral dose and low dose volumes in patients with prostate cancer treated with robotic radiosurgery system.