

Treatment Planning Study Results of the Prostate Cancer

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ABSTRACT

Prostate cancer is one of the most commonly diagnosed cancers among male population across the world. Radiation therapy is currently used as one of the major treatment modalities for cancer treatment. This letter briefly summarizes developments and findings from the prostate cancer treatment planning studies for different modalities such as intensity modulated radiation therapy (IMRT).

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Key words: Radiation therapy; Prostate cancer; IMRT; VMAT; Proton therapy

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LETTER TO THE EDITOR

Prostate cancer is one of the most commonly diagnosed cancers among male population across the world. Radiation therapy is one of the treatment modalities to treat the prostate cancer since it allows in delivering radiation dose to the tumor volume while reducing dose to the normal tissues. Intensity modulated radiation therapy (IMRT) has been used since early 2000s to treat the prostate cancer^[1].

Recently, another form of photon based therapy known as volumetric modulated arc therapy (VMAT) is gaining more attention in the radiation oncology community. This has led to numerous treatment planning studies, which have compared the dosimetric results between the IMRT and VMAT plans of the prostate cancer^[2-10]. In 2013, Abdennebi *et al*^[3] published an article entitled " Comparison of Dose Distribution between Intensity Modulated Radiation Therapy and Dynamic Arc Therapy in and out-of-Field for Prostate Cancer Treatment" in the Journal of Tumor. Abdennebi and colleagues^[3] concluded that dynamic arc therapy (DAT) improves the dosimetric parameters of the prostate cancer treatment by reducing doses to the planning organ at risk volume and remaining volume at risk while keeping the same planning target volume coverage.

Treatment planning studies provide us the dosimetric information in selecting one treatment modality over the another. However, the results among various treatment planning studies may not be consistent with each other. This is mainly because of selection of beam parameters, dose calculation algorithm, plan optimization technique, and delivery technique of the treatment machine^[4]. For example, Sze *et al*^[5] studied the prostate cancer and reported that the double-arc technique (DA) produced higher bladder dose, whereas Yoo *et al*^[6] showed that the DA produced lower doses to the bladder. The type of arc such as partial arc and full arc can also produce different dosimetric results as demonstrated by Rana and Cheng^[8].

Furthermore, dosimetric studies typically report the average results but these results can be patient specific^[2,4]. The difference in tumour location in patients, who have different anatomy, may provide different dosimetric results in the prostate cancer plans. Since the dosimetric quality of treatment plans (IMRT, DAT, VMAT) depend on different factors, one should interpret the results from treatment planning studies with carefulness.

CONFLICT OF INTERESTS

There are no conflicts of interest with regard to the present study.

REFERENCES

1. Otto K. Volumetric modulated arc therapy: IMRT in a single gantry arc. *Med Phys* 2008; 35: 310–17.
2. Rana S, Cheng C, Zheng Y, et al. Proton therapy vs. VMAT for prostate cancer: a treatment planning study. *Int J Particle Ther.* 2014;1:22–33.
3. Abdennebi AB, Auzac G, Chavaudra J, et al. Comparison of Dose Distribution between Intensity Modulated Radiation Therapy and Dynamic Arc Therapy in and out-of-Field for Prostate Cancer Treatment. *Journal of Tumor.* 2013; 1(6): 43-49.
4. Rana S. Intensity modulated radiation therapy versus volumetric intensity modulated arc therapy. *Jrnl of Medical Radiation Scie* 2013; 60: 81–83.
5. Sze HC, Lee MC, Hung WM, Yau TK, Lee AW. RapidArc radiotherapy planning for prostate cancer: Single-arc and double-arc techniques vs. intensity-modulated radiotherapy. *Med Dosim* 2012;37:87-91.
6. Yoo S, Wu QJ, Lee WR, Yin FF. Radiotherapy treatment plans with RapidArc for prostate cancer involving seminal vesicles and lymph nodes. *Int J Radiat Oncol Biol Phys.* 2010;76(3):935-42.
7. Ali MA, Babaiah M, Madhusudhan N, George G, Jain S, Ramalingam K, Kumar SA, Karthikeyan K, Anantharaman A. Comparative dosimetric analysis of IMRT and VMAT (RapidArc) in brain, head and neck, breast and prostate malignancies. *Int J Cancer Ther Oncol* 2015; 3(1):03019.
8. Rana S, Cheng C. Feasibility of the partial-single arc technique in RapidArc planning for prostate cancer treatment. *Chin J Cancer.* 2013;32:546-52.
9. Rout BK, Muralidhar KR, Ali M, Shekar MC, Kumar A. Dosimetric study of RapidArc plans with flattened beam (FB) and flattening filter-free (FFF) beam for localized prostate cancer based on physical indices. *Int J Cancer Ther Oncol* 2014; 2(4):02046.
10. Isa M, Rehman J, Afzal M, Chow JC. Dosimetric dependence on the collimator angle in prostate volumetric modulated arc therapy. *Int J Cancer Ther Oncol* 2014; 2(4):020419.

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