

Is VMAT Ultimate Treatment Modality for the Treatment of Prostate Cancer?

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Prostate cancer is the one of the most commonly diagnosed cancers among men in the United States of America. Different types of treatment techniques are currently available to treat the prostate cancer. In the current issue of American Journal of Medical Case Reports, author [1] concluded that both the intensity modulated radiation therapy (IMRT) and volumetric modulated arc therapy (VMAT) are capable of achieving conformal dose distributions around the target volume while minimizing dose to the normal tissues. [1] Additionally, it was reported that the VMAT provides slight advantage over the IMRT. [1] It must be noted that superiority of the VMAT over the IMRT is still a debating topic due to involvement of several factors, which can have direct impact on the treatment planning results when comparing one treatment modality with another. [2] For instance, the type of dose calculation algorithm used for dose computations can affect the dosimetric results. Author have used the anisotropic analytical algorithm (AAA) [1], and a number of studies have showed that AAA may be less accurate for dose calculations in the cancer treatment plans. [3,4] AAA is a model-based dose calculation algorithm, and it has limitation in dose prediction accuracy in an inhomogeneous medium. [3] For the treatment of prostate cancer, there is an involvement of tissues such as bone, rectum, and bladder, which all have different tissue heterogeneities. Hence, it is important to have an accurate tissue heterogeneity correction while calculating dose in the situation when tissues of different densities are involved in the beam path. A recent study [4] showed that the prostate cancer treatment plans computed by the AAA may have slightly different results from the ones computed by Acuros XB dose calculation algorithm, which has been demonstrated to be more accurate dose engine than the AAA. Hence, it would be an interesting future research topic to compare the impact of the treatment techniques (IMRT vs. VMAT) on the dosimetric results obtained from the prostate cancer treatment plans,

which are computed by Acuros XB. Researchers may also want to compare IMRT and VMAT techniques in terms of radiobiological modeling studies, which can provide the tumor control probability and normal tissue complication probability. [6] These will be useful parameters for the clinicians to predict the treatment outcome. Furthermore, laser photobiomodulation also seems to be a new promising technique for the multi-hallmark treatment of advanced cancer, and further researches are needed explore the benefits on this novel technique and see if it can be used for the prostate cancer treatment.

References

- [1] H Takeshi. Dosimetric Comparison between the Intensity Modulated Radiation Therapy and Volumetric Modulated arc Therapy for Prostate Cancer- A Case Study. American Journal of Medical Case Reports 2014; 2(1): 1-3.
- [2] Rana S. Intensity modulated radiation therapy versus volumetric intensity modulated arc therapy. Jnl of Medical Radiation Scie 2013; 60: 81-83.
- [3] Lu L. Dose calculation algorithms in external beam photon radiation therapy. Int J Cancer Ther Oncol 2013; 1:01025.
- [4] Oyewale S. Dose prediction accuracy of collapsed cone convolution superposition algorithm in a multi-layer inhomogenous phantom. Int J Cancer Ther Oncol 2013; 1:01016.
- [5] Rana S, Rogers K, Lee T, Reed D, Biggs C. Dosimetric impact of Acuros XB dose calculation algorithm in prostate cancer treatment using RapidArc. J Cancer Res Ther 2013; 9(3): 430-5.
- [6] Mavroidis P. Clinical implementation of radiobiological measures in treatment planning. Why has it taken so long? Int J Cancer Ther Oncol 2013; 1(1):01019.
- [7] Santana-Blank L, Rodríguez-Santana E, Reyes H, Santana-Rodríguez J, Santana-Rodríguez K. Laser photobiomodulation: A new promising player for the multi-hallmark treatment of advanced cancer. Int J Cancer Ther Oncol 2013; 1(1):01012.
- [8] Santana-Blank L, Rodríguez-Santana E, Reyes H, Santana-Rodríguez J, Santana- Rodríguez K. Water-light interaction: A novel pathway for multi hallmark therapy in cancer. Int J Cancer Ther Oncol 2014; 2(1):02012.