



Radiotherapy Technique for the Prostate Cancer Treatment: A Short Communication

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ABSTRACT

Prostate cancer is the one of the most commonly diagnosed cancer among men throughout the world. In the recent days, prostate cancer can be managed by several options such as surgery, chemotherapy, radiotherapy, etc. Radiotherapy is considered as one of the popular options to treat prostate cancer due to excellent survival rate and fewer side effects. The field of radiotherapy is evolving since the days of 3-dimensional conformal radiotherapy (3DCRT), and it is now possible to treat the cancer using more advanced techniques such as intensity modulated radiation therapy (IMRT), volumetric modulated arc therapy (VMAT), proton therapy, and carbon therapy. This letter addresses some of the major radiotherapy techniques available for the cancer treatment.

Keywords: Prostate cancer, Radiation therapy.

INTRODUCTION

Prostate cancer is the one of the most commonly diagnosed cancer among men throughout the world. The improvement in radiation treatment delivery has also improved the conformal radiation dose distributions to the tumor while sparing normal tissues. Even within the radiation therapy, there are various techniques available for the prostate cancer treatment. In photon radiation therapy, two most commonly used techniques are volumetric modulated arc therapy (VMAT) and intensity modulated radiation therapy (IMRT). In IMRT, the radiation beam is

delivered in the form static fields, whereas in the VMAT, it delivers radiation beam with simultaneous adjustment of gantry rotation speed, dose rate, and multi leaf collimators¹.

Current literature suggests that VMAT is capable of producing radiation dose distributions similar to that of the IMRT.² However, the agreement on superiority of VMAT over IMRT is less straight forward due to the involvement of various factors that could affect the dosimetric results.² For example, a study³ compared various techniques within the

VMAT for fourteen prostate cancer patients, and reported that VMAT with two arcs was better than the VMAT with the single arc. Another research group⁴ reported favorable results using single arc than using double arc. In a different study⁵, authors did not report the significant difference between double and single-arc techniques in the VMAT. A new study⁶ showed that partial single arc technique could produce comparable or better results than the full single arc, and such technique will benefit prostate cancer patients due to lower rectal and bladder dose. It has also been reported that results may be dependent on the energy selection⁷, dose calculation algorithms⁸ and treatment planning systems that are used to compute dose in the prostate cancer treatment plans⁹.

Proton therapy is another popular radiotherapy technique for the prostate cancer treatment. It is considered as one of the most advanced technologies for the treatment of the cancer. Recent studies^{10,11} have shown that proton therapy is better in sparing critical structures when compared to the 3DCRT and IMRT. Another research group¹² studied 12 high-risk prostate cases and demonstrated that prostate cancer patients will benefit from proton therapy when compared to the VMAT.

CONCLUSIONS

While there are various radiotherapy techniques available for the prostate cancer treatment, it can be said that dosimetric results will be influenced by various factors such as treatment delivery technique, experience of the treatment planner, available resources, treatment planning system, etc. Nevertheless, future studies must include the clinical proton therapy protocols involving many institutions, and this could help in interpreting the results from prostate cancer studies more accurately.

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