

# Retrospective Analysis of Whole Pelvis Radiation Therapy of Prostate Cancer: A Clinical Experience

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## INTRODUCTION

Prostate Cancer is the most frequent malignancy and a major cause of morbidity and mortality amongst men and ranks second in cancer related deaths in the United States and third in Canada [1, 2]. The standard treatment modalities include surgery, radiation therapy, hormonal therapy and chemotherapy or any combination depending on the stage of the tumor. Radiation therapy is a common and effective treatment modality for low and intermediate risk patients with localized prostate cancer to treat the intact prostate or prostate bed [3-5]. However, for high risk patients with increased risk of nodal involvement, treatment with radiation will usually involve a 2 phase approach: 1) a treatment of the whole pelvis to cover the prostate and seminal vesicles and the pelvic lymph nodes 2) a boost delivery dose to the prostate or prostate bed. Radiation therapy is also an effective salvage therapy for biochemical recurrence following prostatectomy.

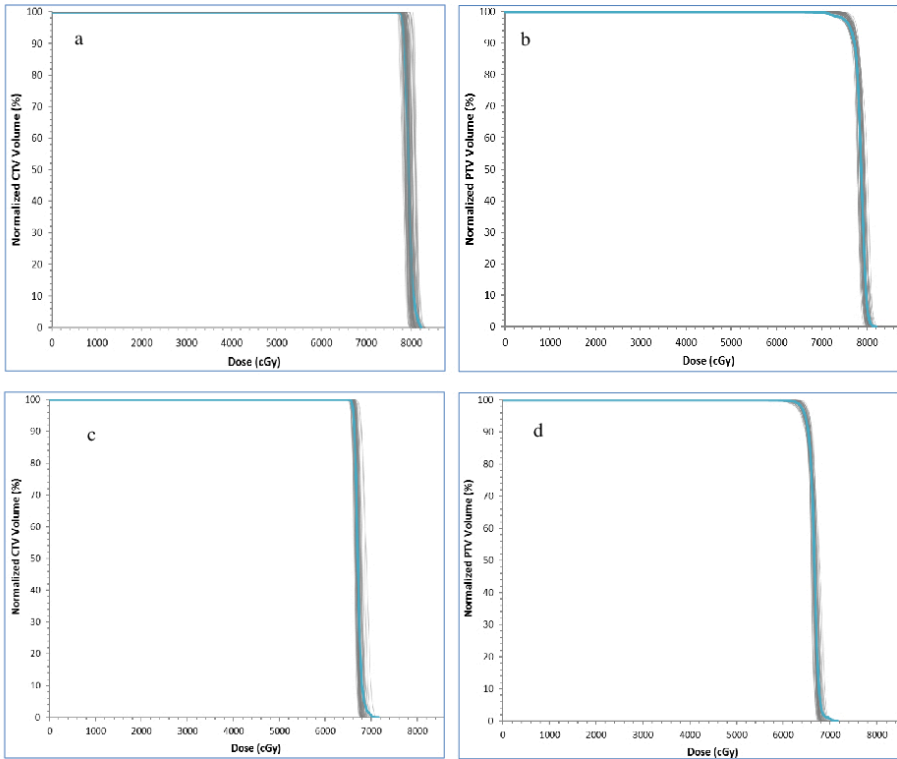
## AIM

The objective of this study is to conduct a comprehensive retrospective dosimetric analysis of whole pelvis radiation therapy plans for prostate cancer patients treated over a period of 3 years in order to develop an institutional criterion for accepting volume-based whole pelvis radiation therapy treatment plans based on our current experiences and resources.

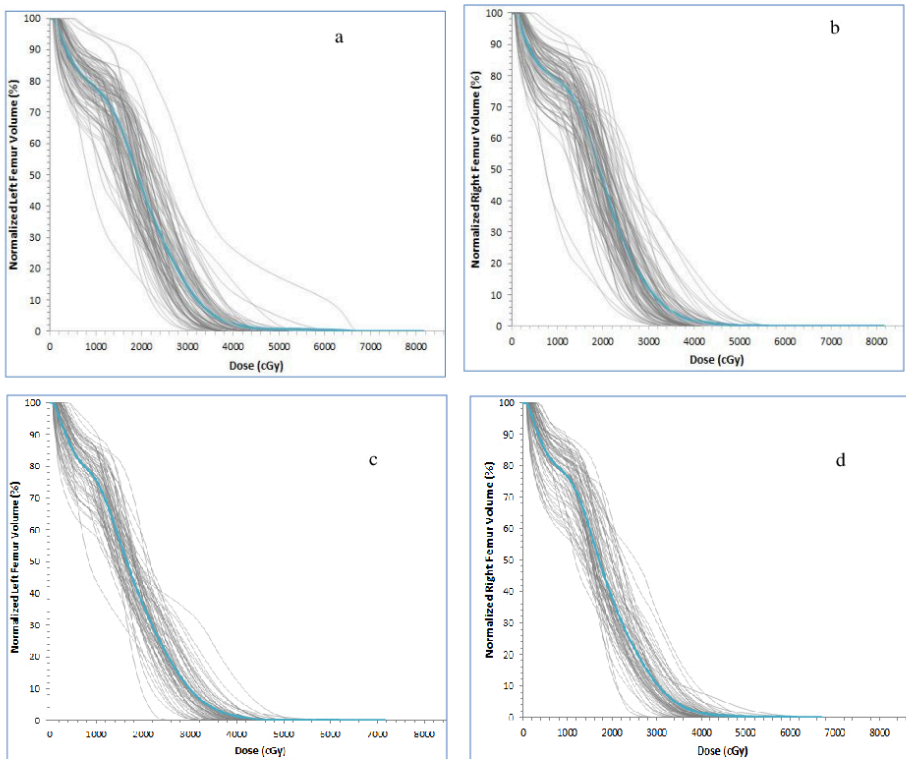
## MATERIALS AND METHODS

The retrospective analysis was performed on the basis of treatment plans for 179 prostate cancer patients treated over a period of 3 years at the cancer center with the VMAT technique via RapidArc (Varian Medical Systems, Palo Alto, CA, USA) using 6 MV photon beam. The patients were stratified into two cohorts; WPRT plus a boost dose to the prostate and WPRT plus a boost dose to prostate-bed. The first cohort comprised of 114 patients treated with a total prescription dose of 78 Gy in 39 fractions (78Gy/39): 46Gy in 23 fractions was delivered to the whole pelvis and a boost dose of 32Gy in 16 fractions was delivered to the prostate. The second cohort consisted of 65 patients treated with a total prescription dose of 66Gy in 34 fractions (66Gy/33): 46Gy in 23 fractions was delivered to the whole pelvis and a boost dose of 22Gy in 11 fractions was delivered to the prostate bed. .

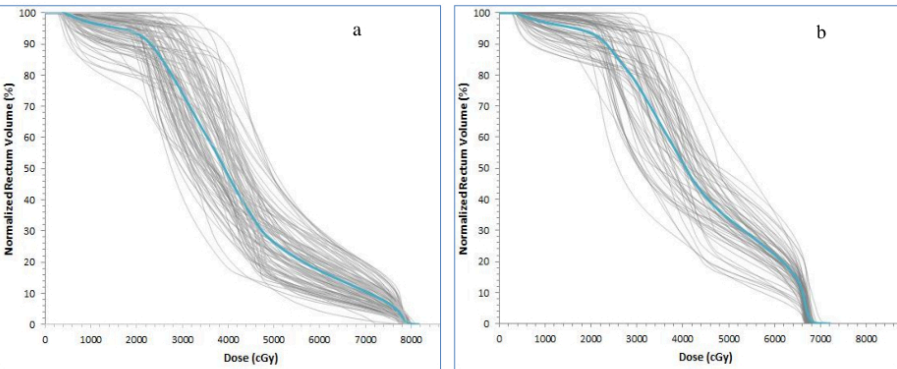
## RESULTS



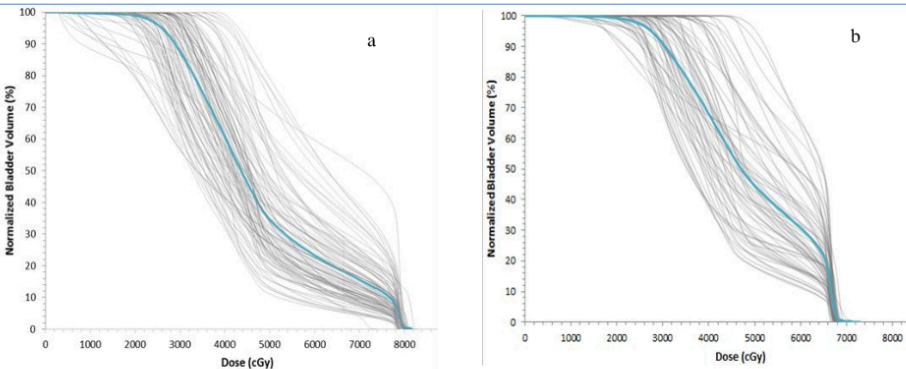
**Figure 1:** Dose-volume histograms (DVHs) of the CTV and PTV volumes for all patients. Figures 1a and 1b are for patients treated at 78Gy in 39 fractions and Figures 2c and 2d are for patients treated at 66Gy in 33 fractions. Also, shown in each plot in blue are the mean DVHs for all patients.



**Figure 2:** Dose-volume histograms (DVHs) of the Left and Right femur volumes for all patients. Figure 2a and 2b are for patients treated at 78Gy in 39 fractions and Figures 2c and 2d are for patients treated at 66Gy in 33 fractions. Also, shown in each plot in blue are the mean DVHs.



**Figure 3:** DVHs of the Rectum volumes for all patients. Figure 3a is for patients treated at 78Gy in 39 fractions and Figure 3b is for patients treated at 66Gy at 33 fractions. Also, shown in each plot in blue are the mean DVHs.



**Figure 4:** DVHs of the Bladder volumes for all patients. Figure 4a is for patients treated at 78Gy in 39 fractions and Figure 4b is for patients treated at 66Gy at 33 fractions. Also, shown in each plot in blue are the mean DVHs.

## CONCLUSION

The use of VMAT technique for 2-phase (i.e. whole pelvis treatment plus boost to the prostate or prostate bed) radiation therapy of high risk prostate cancer patients is an efficient and reliable method for achieving superior dose conformity, uniformity and homogeneity to the PTV-primary and minimal doses to the organs at risk.

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