119 - RADIATION TREATMENT IN PROSTATE CANCER: COMPARISON BETWEEN DIFFERENT DELIVERY TECHNIQUES AND FRACTIONATION SCHEDULES

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BACKGROUND

Prostate cancer (PC) is one of the most commonly diagnosed malignancy in men worldwide. Due to wider prostate specific antigen (PSA) use there is an increase of patients diagnosed at an early stage of disease.

Currently, radical radiation therapy (RT), radical RT coupled to androgen deprivation therapy (ADT) and post–radical prostatectomy adjuvant RT are the main treatment modalities for most patients with localized or locally advanced PC.

To decrease the risk of toxicity to healthy tissues, several distinct techniques, such as 3D-conformal radiation therapy (3D-CRT), intensity modulated radiation therapy (IMRT) or volumetric modulated arc therapy (VMAT), have been developed, that increase the possibility of conformity of the radiation beam and, coupled to image guide radiation therapy (IGRT), reduce the margins of planning target volume, ameliorating the therapeutic index.

The objective of this study is to compare the toxicity profile of different RT technique and fractionation in patients treated for prostate cancer. Acute gastro-intestinal (GIT), urologic (UT), and hematologic toxicities (HT) of irradiation in patients treated with conformal radiotherapy (3D-CRT) with conventional fractionation, and VMAT either with hypo-fractionation for radical treatment, or with conventional fractionation for adjuvant treatment for prostate cancer, were evaluated.

METHODS

Fifty seven consecutive patients with non-metastatic prostate cancer treated at the Radiotherapy Section of Advanced Biomedical Sciences Department of the University "Federico II" (Naples, Italia) between January 2012 and May 2018 were retrospectively evaluated. Radiation treatment was delivered alone or after surgery with doses ranging between 66 and 76 Gy. Conventional fractionation was used in adjuvant setting (both 3DCRT and VMAT) and radical setting with 3D-CRT, while hypofractionation, 2.7 Gy fraction given 5 times per week with a total dose of 67.5 Gy, was used only when VMAT technique was employed to irradiate radically the prostate. A high energy linear accelerator was used for treatment. Six static fields were used for 3D-CRT, while two coplanar dynamic arcs moving clockwise and counter-clockwise were used for VMAT. The patients were checked weekly during the treatment and toxicity was recorded and graded according to Radiation Therapy Oncology Group (RTOG); blood test was taken before and during the treatment.

RESULTS

Patients median age resulted to be 71 years (range, 47-82 years); median PSA level as measured before the beginning of radiation treatment was 3.6 ng/mL. Thirty six (63.1%) patients had T-stage 2, 18 (31.6%) had T-stage 3, while for 3 (5.3%) patients this information was not available. Regarding the PC risk, 22 (38.6%) patients resulted with intermediate risk disease, 17 (29.8%) resulted with high risk disease, 16 (28.1%) had a very high risk disease, while for 2 (3.5%) the information was not available. With a median follow-up of 33 months (range, 6-83 months), 4 (7.0%) deaths were registered, two (3.5%) of which directly related to the tumor. Twenty patients (35.1%) had undergone surgery and twenty-seven patients (47.4%) received hormone therapy in combination with RT. Acute gastrointestinal, urological and hematologic toxicity was observed in 42.1%, 80.7%, and 24.6% of patients. With regard to fractionation scheme, significant differences in toxicity profile were not observed in the no surgery/no hormone therapy subgroup. Lymphopenia grade 1, grade 2 and grade 3 was observed in 1 (1.7%), 2 (3.5%) and 1 (1.7%) patients, respectively. Grade 1 thrombocytopenia was found in 2 (3.5%) patients; grade 1 anemia was observed in 10 (17.5%) patients. No patients presented neutropenia.

It was found subacute grade 1 GIT in 2 (3.5%) patients; 21 (36.8%) presented irritative lower urinary tract symptoms.

CONCLUSION

External beam radiation therapy is a favorable treatment option in non-metastatic prostate cancer. In our study, with the limit of a low number of patients, we found that different fractionation schedule (2.7 fraction/67.5Gy vs. 2Gy fraction/76Gy) and treatment technique (VMAT vs 3D-CRT) did not show statistically significant differences in acute gastro-intestinal, urologic, and hematologic toxicities. These results need to be validated with larger studies.

Age at diagnosis	71 (47-82)
T stage	
2	36 (63.1)
3	18 (31.6)
Missing	3 (5.3)
Gleason score	
≤ 6	9 (15.8)
7	21 (36.8)
≥ 8	27 (47.4)
NCCN risk classification	
Intermediate	22 (38.6)
High	17 (29.8)
Very high	16 (28.1)
Missing	2 (3.5)
Prostate surgery	20 (35.1)
Hormone therapy	27 (47.4)
Dose (Gy)	
66	6 (10.5)
67.5	3 (5.3)
68	10 (17.5)
70	16 (28.1)
72	2 (3.5)
76	20 (35.1)
Treatment modality	
VMAT	25 (43.9)
3D-CRT	32 (56.1)
Follow-up (months)	33 (6-83)

Tab. 1 Patients' characteristics

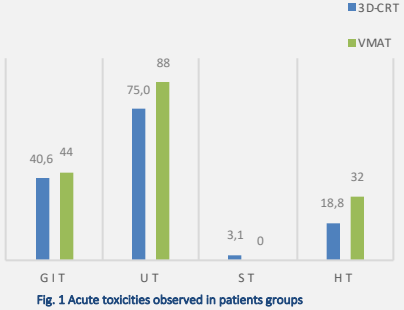

Fig. 1 Acute toxicities observed in patients groups