# TOXICITY AND OUTCOMES ASSESSMENT OF HYPOFRACTIONATED HELICAL TOMOTHERAPY FOR LOCALIZED PROSTATE CANCER: A SINGLE-CENTER EXPERIENCE

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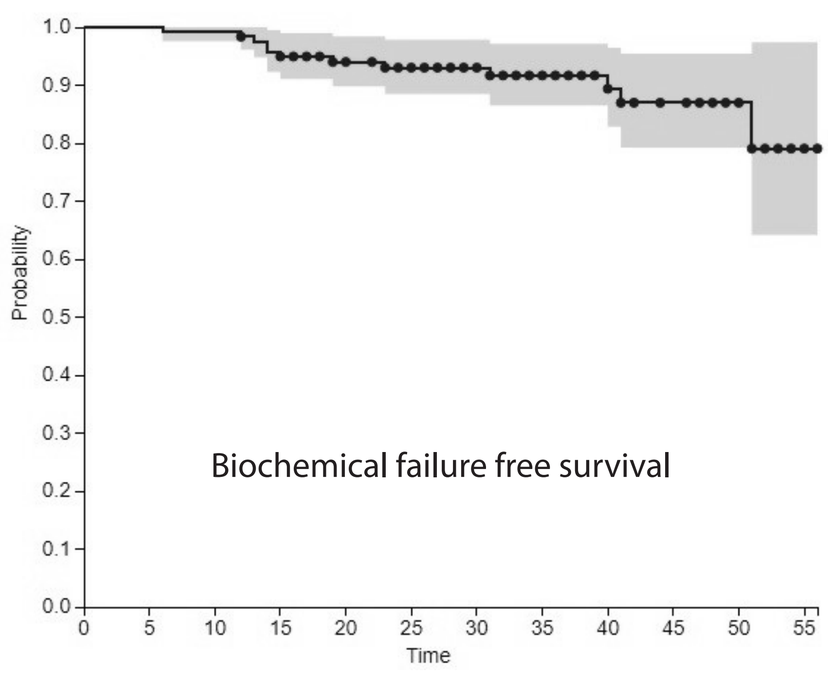
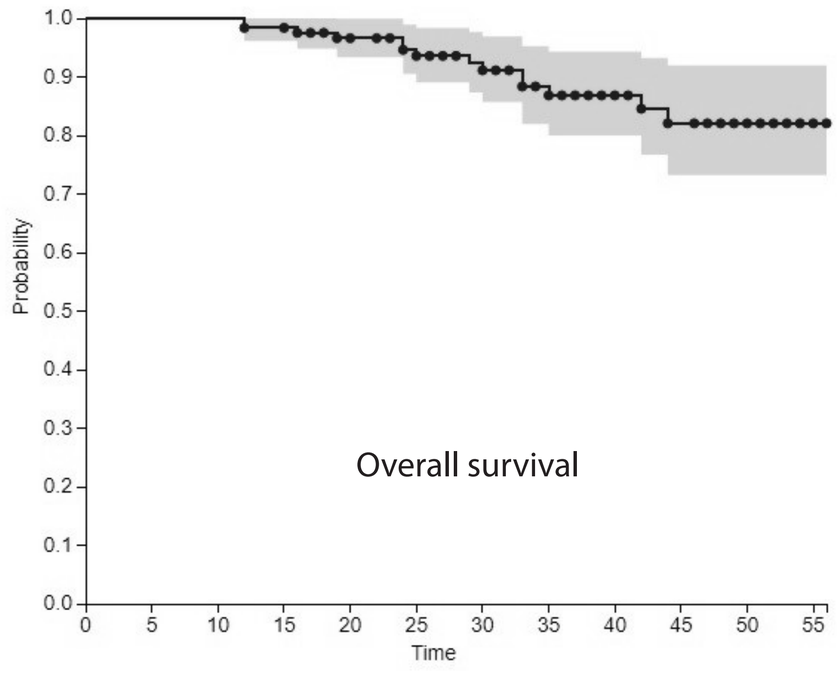
**Aim:** Due to the radiobiological characteristics of a tumor with a low α/β ratio, thus more sensitive to higher doses per fraction, prostate cancer (PC) represents one of the first neoplasms where the use of hypofractionation took place, allowing to reach a shortening of the overall treatment time and a higher impact on clinical outcomes. Several experiences in literature reported the non inferiority of moderate hypofractionated schedules (2.2-4 Gy per fraction) in terms of toxicity and biochemical control. Here we report our experience of moderate hypofractionated IMRT-IGRT with Helical Tomotherapy in the definitive setting of prostate cancer. This study aims to assess toxicity and clinical outcomes.

**Materials and Methods:** From December 2012 to September 2017, 123 patients with prostate cancer were treated with curative intent using hypofractionated Helical Tomotherapy. Median age was 76 years (range, 56-88). 41% were low risk (LR), 29% intermediate risk (IR), 30% high risk (HR); median iPSA was 9,73 ng/ml (1,35-170). Androgen deprivation therapy was prescribed by the referring urologist according to NCCN recommendations for all intermediate risk and high risk subjects. For 29 patients with low and intermediate risk disease with a baseline IPSS score ≤19 we adopted a 3 Gy per fraction schedule, delivering in 20 fractions 60 Gy to the prostate and 54 Gy to seminal vesicles for IR. All the remaining patients received 70 Gy in 28 fractions to the prostate, using 2.5 Gy per fraction. Through the simultaneous integrated boost technique, in the intermediate risk group seminal vesicles were treated with a total dose of 61.6 Gy using 2.2 Gy fractions; pelvic lymph nodes irradiation in conventional fractionation was added for all the high risk cases with a total dose of 50.4 Gy. Image guidance was performed with daily megavoltage computed tomography (MVCT) prior to every fraction in order to check setup accuracy and to verify adequate bladder filling and rectal emptying. Toxicity was prospectively evaluated using Common Terminology Criteria for Adverse Events (CTCAE) V4.0; biochemical failure was defined following Phoenix definition of Nadir PSA value + 2 ng/ml. Kaplan-Meier analyses were conducted for Overall Survival (OS) and biochemical failure-free survival (BFFS) estimates.

**Results:** Median follow-up was 33 months (range 12-56). Acute G1 and G2 gastrointestinal (GI) toxicity rates were 20.3% and 11%; acute G1 and G2 genitourinary (GU) were 47% and 10.5%; no ≥G3 was detected. 1-year GI and GU rates were respectively G1 in 18.6%, G2 in 3.2%, G1 in 19.5% and G2 in 2.4%. At two years (n=102) GI adverse events rates were G1 in %, G≥2 in 6.8%, including four cases of G3 rectal bleeding; for GU toxicity we observed G1 in 10.7%, G≥2 in 2% (one G3 urethral stenosis). At 3 years (n=63) toxicity rates were G1 in 14.2% and G2 in 8%, while for GI we observed G1 in 14.7% and G2 in 3%, no G3 occurred. After four years (n=24) we observed G1 in 4.76% for both GI and GU. Most common acute and late adverse events were respectively dysuria and urgency for GU and diarrhea and proctitis for GI. At the time of final analysis, twelve patients experienced a biochemical relapse, including 3 nodal recurrences, successfully treated with stereotactic body radiotherapy, and 2 bone metastases who underwent palliative RT, resulting in 2- and 3-yrs BFFS rates of 93% and 90.4% respectively. 3- and 4-yrs OS rates were 90% and 88%. (Figures 1 and 2)




Biochemical failure free survival




Overall survival

**Conclusion:** Our series supports the moderate hypofractionated schedule as a well tolerated regimen reporting excellent rates of acute and late toxicity. As regards biochemical control rates, our results are comparable to other experiences of hypofractionation for prostate cancer available in literature.

2018

2012 to 2017

Patient n= 123
Median Age = 76 years

41% were low risk (LR),
29% intermediate risk (IR),
30% high risk (HR)

median iPSA: 9,73 ng/ml

TREATMENT

Androgen deprivation therapy

IMRT-IGRT WITH TOMOTHERAPY

MEDIAN FOLLOW-UP
33 months
(range 15-56)

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