

Theme: Clinical

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Abstract Title: Long-term outcomes of image-guided proton therapy for localized prostate cancer

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Background / Aims: Proton therapy (PT) remains much controversy about its routine use in localized prostate cancer treatment. Particularly, comprehensive data of gold fiducial marker matching in PT is less abundant compared to bone matching. The aim of this study was to evaluate long-term efficacy and safety of image-guided PT (IGPT) for localized prostate cancer.

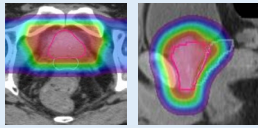
The registry number: 14-02-17(14) (16)

Subjects and Methods:

Oct 2024-, pts. could choose either NFPT or MHPT.

Feb 2013- Normofractionated PT (NFPT):
Oct 2014- Moderately hypo. PT (MHPT):

Low: 74 GyRBE/37 Fr
Other: 78 GyRBE/39 Fr
Low: 60 GyRBE/20 Fr
Other: 63 GyRBE/21 Fr



ADT

Low risk: none
Intermediate risk: 6-8 Mof neoadju.
High or very h risk: 6-8 M of neo + adj., total 24 M ADT

SpaceOAR®:May 2018

TPS	VQA ver.3.0- (Hitachi Ltd), MIM Maestro (MIM), Calculation model: Pencil beam, grid: 2.0 mm
Machine	PROBEAT-III (Hitachi Ltd), Passive-scattering
Planning	CT 2.0 mm, MRI T2WI 2.5mm in thickness
Target	CTV = Prostate + SV for each NCCN risk, Beam specific PTV = Proximal + distal margin for CTS
Prescription	Isocenter PTV D95 ≥ 95% (ideal)
Matching	Orthogonal digital kv radiographs, Bone + Gold etc... Anchor®(Naslund) matching, SpaceOAR®(Boston S)

Dose constraints: partially changed in August 2014, Patients registered until March 2021, before the transition to the new fractionation protocol were analyzed.

Results: **Total n =1570 Feb 2012-Mar 2021** Median f/u(surviving pts.): **68M**(20-130)

Patient and tumor characteristics		NFPT	MHPT	Total
Number	N	327	1243	1570
Age	Mean ± SD	69 ± 7	69 ± 7	69 ± 7
T stage	1c-2a/2b-2c/3a-3b	192/86/49	764/314/165	956/400/214
Gleason	6/7/8-10	76/138/113	250/611/382	326/749/495
PSA	< 10/10-20/20<	183/95/ 49	846/259/138	1029/354/187
NCCN 2018	Low/Int/High+very high	51/133/143	177/582/484	228/715/627
SpaceOAR	No/Yes	310/17	638/605	948/622

Low-/Int-/ High or very high-risk

5-year bRFS: 95.7%, 96.5%, 91.8%
OS: 97.1%, 97.5%, 97.7%
bRF: 98.6%, 98.8%, 93.9%

	Grade 2	Grade 3
Acute/Late GI	0%/2.9%	0 %/0.1%
Acute/Late*GU	9.4%/4.4%	0.06 %/0.8%

*bleeding, urinary retention

Univariate Cox Analysis for bRFS

Factor	Level	HR (95% CI)	P
NCCN	High/Int	1.74(1.18,2.57)	0.006
PS	1<-/ 0	3.29(1.19,9.07)	0.021
T stage	2b-2c/1c-2a	1.73(1.12,2.68)	0.014
	3a<-/1c-2a	4.10(2.65,6.35)	<0.001
PSA	10-20/<10	2.23(1.48,3.37)	<0.001
	20</<10	2.96(1.85,4.76)	<0.001

Conclusions: IGPT with fiducial markers for localized prostate cancer is favorable and well tolerated. Further hypofractionated IGPT with hydrogel spacer is expected.