

HDR Prostate Monotherapy

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Advantages of temporary HDR prostate brachytherapy

- Brachytherapy enables localised high dose with reduced dose to critical normal tissues
 - rectum, bladder, small bowel
- Uses volume definition after implant; can be customised to individual volume.
- Can implant larger volume than permanent seed implant including extracapsular region and seminal vesicals
- Can achieve higher BED than ext beam or seed implant

HDR implant: biological advantage 2Gy EQD

	α/β 1.5	α/β 3.5	α/β 10
• Ext beam 74Gy/37f	74	74	74
• HDR mono			
34Gy/4f	96.9	74.2	52.4
36Gy/4f	108	81.8	57.0
31.5Gy/3f	108	80.2	53.8
26Gy/2f	108	78.0	49.8

Disadvantages of temporary HDR prostate brachytherapy

- High dose rate radiation requires fractionation
 - dose per fraction and biological equivalence
 - logistics:
 - single implant: retention and verification
 - repeated implants: anaesthesia, resource intensive
- Limited clinical outcome data

High-dose-rate brachytherapy without external beam irradiation for locally advanced prostate cancer

Yasuo Yoshioka^{a,*}, Koji Konishi^a, Ryoong-Jin Oh^a, Iori Sumida^a, Hideya Yamazaki^a, Satoaki Nakamura^a, Kazuo Nishimura^b, Norio Nonomura^b, Akihiko Okuyama^b, Takehiro Inoue^a

^aDepartment of Radiation Oncology, and ^bDepartment of Urology, Osaka University Graduate School of Medicine, Japan

T&O 2006

- 48-54Gy in 8 - 9 fractions
- 111 patients 1995 - 2004
 - Low risk: 15
 - Inter risk: 28
 - High risk: 68

 - Median PSA: 18.1 (3.8 - 233)
 - Neoadjuvant hormones in 92

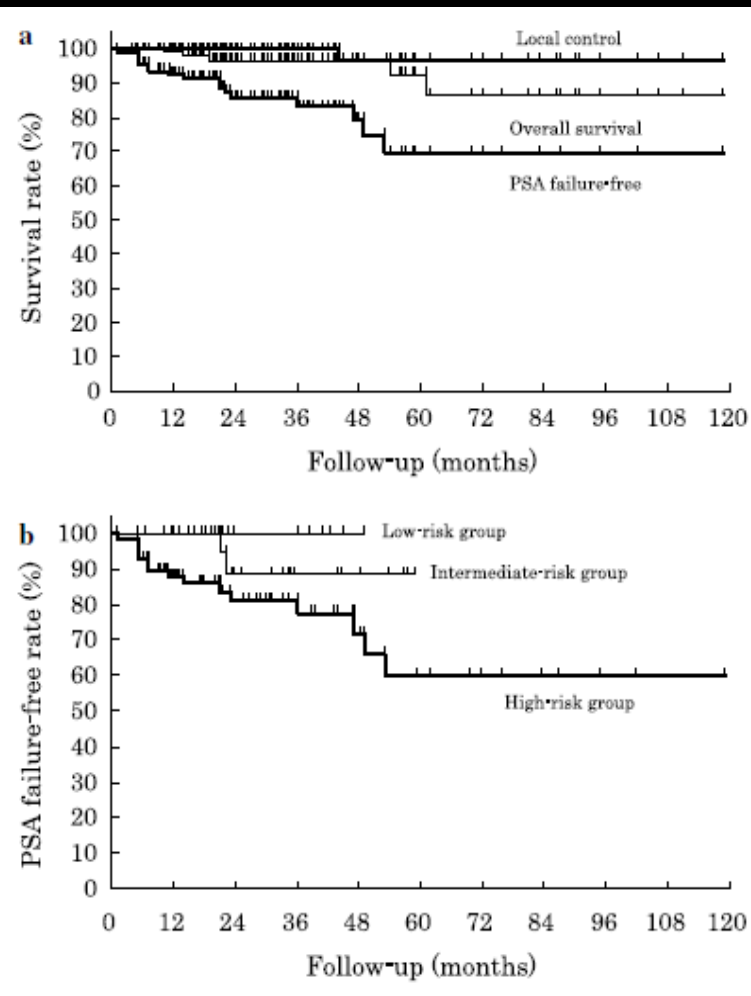
 - Median follow up: 27 months (5-119)

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Table 2
Acute toxicities (n = 111)

Grade	Adverse event	n
Grade 4		0
Grade 3	Urinary frequency/urgency	3
	Hemorrhage – bladder or urethra	1
	Urinary retention	1
	Pain – urethra	1
	Total	6
Grade 2	Urinary frequency/urgency	16
	Hemorrhage – bladder or urethra	3
	Urinary retention	3
	Obstruction – urethra	2
	Pain – anus	2
	Pain – urethra	2
	Pain – perineum	1
	Total ^a	23
Grade 1		56

Grade, CTCAE v3.0.

^a Some patients showed multiple events.

Table 3
Late toxicities (n = 111)

Grade	Adverse event	n
Grade 4		0
Grade 3	Perforation – colon	1 ^a
Grade 2	Hemorrhage – rectum	8
	Urinary frequency/urgency	3
	Hemorrhage – bladder or urethra	2
	Obstruction – urethra	1
	Total ^b	12
Grade 1		29

Grade, CTCAE v3.0.

^a This patient developed a sigmoid-colon perforation 7 years after brachytherapy and underwent colostomy.

^b Some patients showed multiple events.

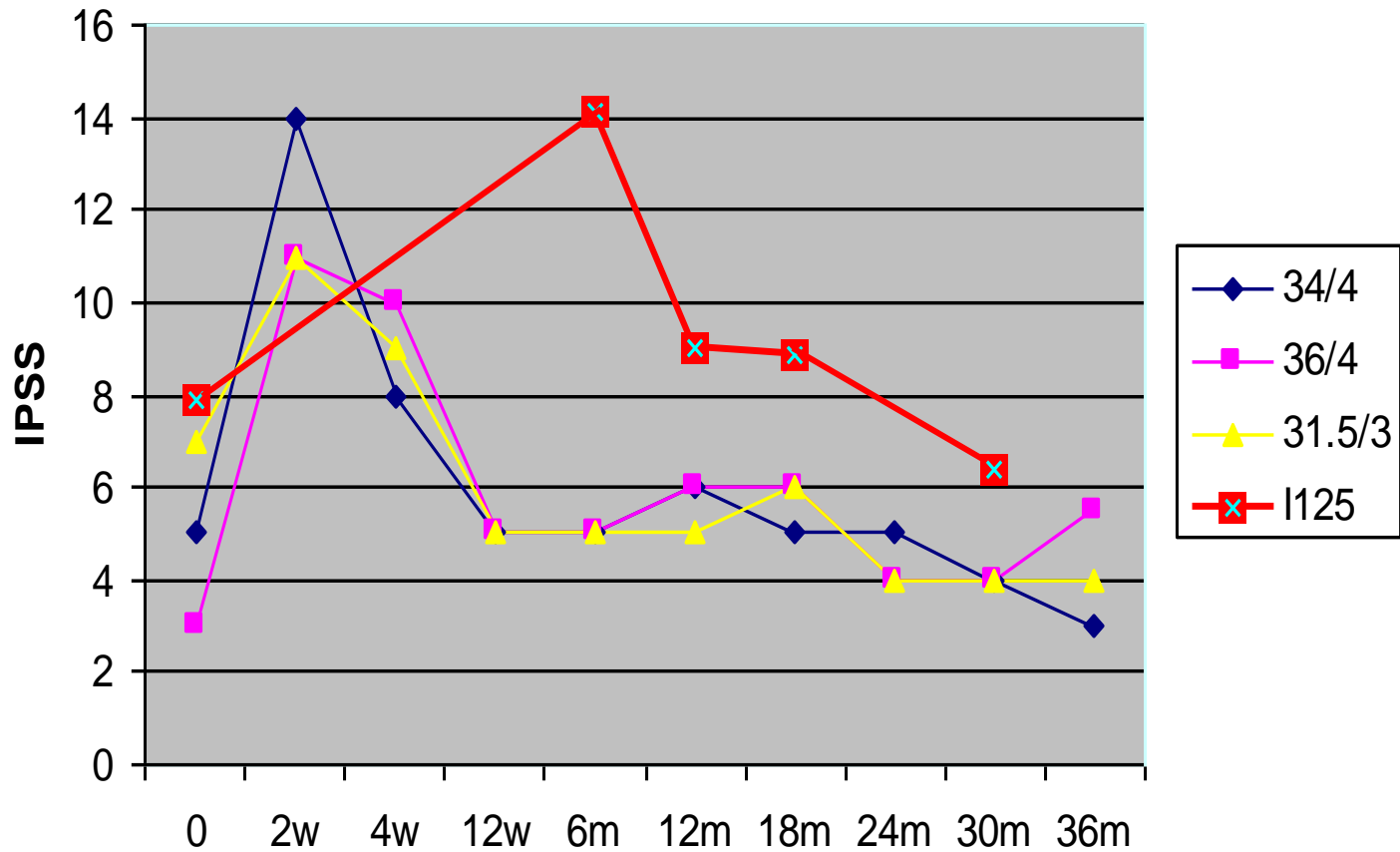
Mount Vernon HDR Monotherapy Patient Demographics

- 197 patients
- November 2003-March 2010

Dose	Mean Age (Years)	Number of Patients
34 Gy /4#	67	30
36 Gy /4#	68	25
31.5 Gy /3#	69	109
26Gy / 2#	73	33

MV HDR monotherapy

Urinary toxicity vs I125



HDR vs LDR (Pd) toxicity

Martinez et al 2009

- 454 patients : 1993-2004
- 248 HDR
 - WBH Michigan 38Gy in 4f 1 implant
 - CET Oakland 42Gy in 6f 1 implant
- 206 LDR Pd 120Gy

	LDR	WBH	HDR
			CET
5yr bRFS	89%	91%	89%

HDR vs LDR (Pd) toxicity

Martinez et al 2009

	LDR	HDR
Acute Toxicity \leq G3		
Dysuria	60%	39%
Frequency/urgency	90%	58%
Rectal pain	17%	6.5%
Late toxicity		
Dysuria	22%	15%
Frequency/urgency	54%	43%
Impotence	30%	20%

HDR MONOTHERAPY

- Early experience in advanced cases suggests high rates of biochemical control
- Optimal indication yet to be defined:
?intermediate/high risk...?low risk
- Acute toxicity less than seed brachytherapy
- Late toxicity profile may also be favourable with lower rates of late urinary and erectile dysfunction