# BRACHYTHERAPY IN CARCINOMA PROSTATE

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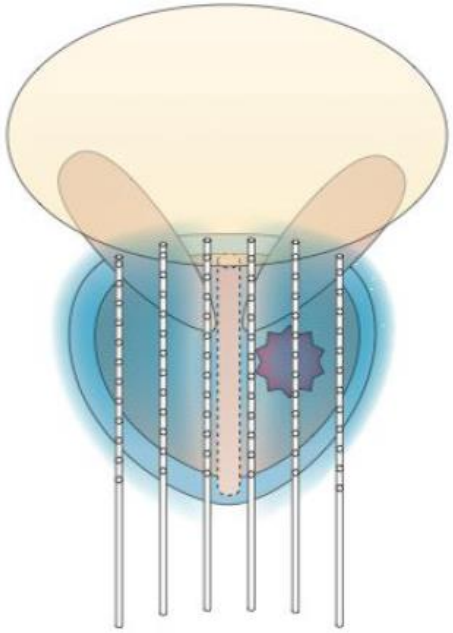

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- Indications and Rationale
- Types
- Monotherapy
- Combination with EBRT
- Evidence
- Technique
- Salvage

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## Estimated New Cases

Males

| | | |
|---|---|---|
| Prostate | 248,530 | 26% |
| Lung & bronchus | 119,100 | 12% |
| Colon & rectum | 79,520 | 8% |
| Urinary bladder | 64,280 | 7% |
| Melanoma of the skin | 62,260 | 6% |
| Kidney & renal pelvis | 48,780 | 5% |
| Non-Hodgkin lymphoma | 45,630 | 5% |
| Oral cavity & pharynx | 38,800 | 4% |
| Leukemia | 35,530 | 4% |
| Pancreas | 31,950 | 3% |
| **All Sites** | **970,250** | **100%** |

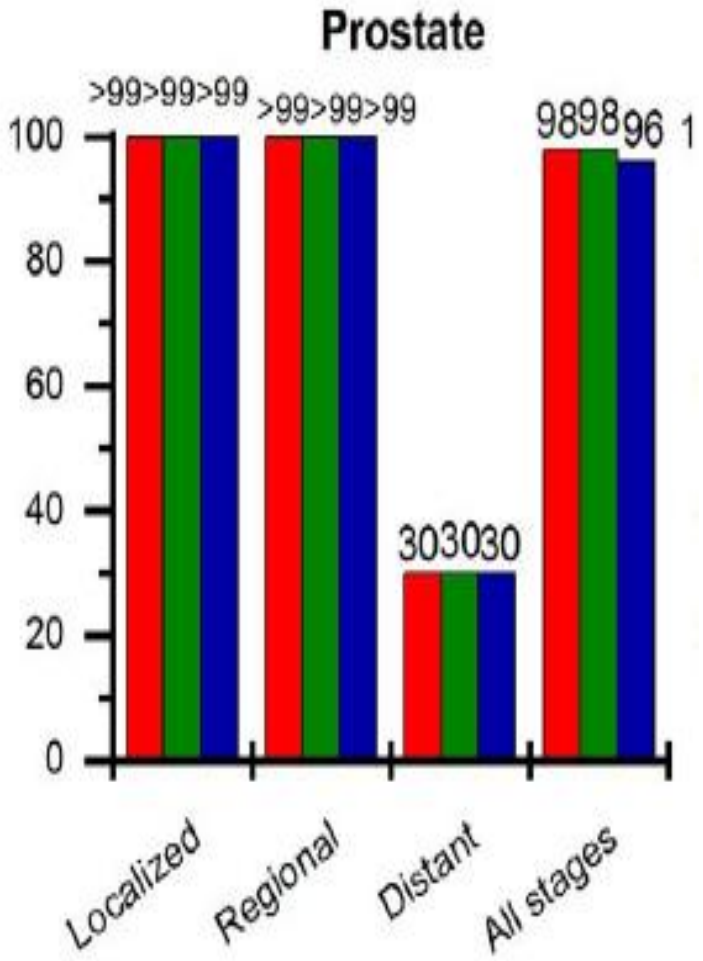
## Estimated Deaths

Males

| | | |
|---|---|---|
| Lung & bronchus | 69,410 | 22% |
| Prostate | 34,130 | 11% |
| Colon & rectum | 28,520 | 9% |
| Pancreas | 25,270 | 8% |
| Liver & intrahepatic bile duct | 20,300 | 6% |
| Leukemia | 13,900 | 4% |
| Esophagus | 12,410 | 4% |
| Urinary bladder | 12,260 | 4% |
| Non-Hodgkin lymphoma | 12,170 | 4% |
| Brain & other nervous system | 10,500 | 3% |
| **All Sites** | **319,420** | **100%** |

# Cancer Statistics, 2021

CA CANCER J CLIN 2021;71:7-33




INDIA – 9-10/100000 population

# Risk Stratification of Carcinoma Prostate

**Table 1. Organizational pre-treatment prostate cancer risk stratification systems**

| Institution/organization | Low risk | Intermediate risk | High risk |
|---|---|---|---|
| Harvard (D'Amico)[12]<br>AUA[33]<br>EAU[34] | T1-T2a and GS ≤6 and PSA ≤10 | T2b and/or GS =7 and/or PSA >10-20 not low-risk | ≥T2c or PSA >20 or GS 8-10 |
| GUROC*[3]<br>NICE[31] | T1-T2a and GS ≤6 and PSA ≤10 | T1-T2 and/or Gleason ≤7 and/or PSA ≤20 not low-risk | ≥T3a or PSA >20 or GS 8-10 |
| CAPSURE*[41] | T1-T2a and GS ≤6 and PSA ≤10 | T2b and/or GS =7 and/or PSA >10-20 not low-risk | T3-4 or PSA >20 or GS 8-10 |
| NCCN[30] | T1-T2a and GS 2-6 and PSA ≤10 not very low-risk AND very-low risk category: T1c and GS ≤6 and PSA <10 and Fewer than 3 biopsy cores positive and ≤50% cancer in each core | T2b or T2c and/or GS =7 and/or PSA >10-20 not low-risk | T3a or PSA >20 or GS 8-10 not very high risk AND very high-risk category: T3b-4 |
| ESMO[32] | T1-T2a and GS ≤6 and PSA <10 | Not high risk and not low risk (the remainder) | T3-4 or PSA >20 or GS 8-10 |

# Risk Stratification

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| Risk Group | Clinical/Pathologic Features<br>See Staging (ST-1) | | |
|---|---|---|---|
| Very low[e] | Has all of the following:<br>• cT1c<br>• Grade Group 1<br>• PSA <10 ng/mL<br>• Fewer than 3 prostate biopsy fragments/cores positive, ≤50% cancer in each fragment/core[f]<br>• PSA density <0.15 ng/mL/g | | |
| Low[e] | Has all of the following but does not qualify for very low risk:<br>• cT1–cT2a<br>• Grade Group 1<br>• PSA <10 ng/mL | | |
| Intermediate[e] | Has all of the following:<br>• No high-risk group features<br>• No very-high-risk group features<br>• Has one or more intermediate risk factors (IRFs):<br>▸ cT2b–cT2c<br>▸ Grade Group 2 or 3<br>▸ PSA 10–20 ng/mL | Favorable intermediate | Has all of the following:<br>• 1 IRF<br>• Grade Group 1 or 2<br>• <50% biopsy cores positive (eg, <6 of 12 cores)[f] |
| | | Unfavorable intermediate | Has one or more of the following:<br>• 2 or 3 IRFs<br>• Grade Group 3<br>• ≥ 50% biopsy cores positive (eg, ≥ 6 of 12 cores)[f] |
| High | Has no very-high-risk features and has exactly one high-risk feature:<br>• cT3a OR<br>• Grade Group 4 or Grade Group 5 OR<br>• PSA >20 ng/mL | | |
| Very high | Has at least one of the following:<br>• cT3b–cT4<br>• Primary Gleason pattern 5<br>• 2 or 3 high-risk features<br>• >4 cores with Grade Group 4 or 5 | | |

**NCCN Guidelines Version 4.2022**
**Prostate Cancer**

# Why brachytherapy ?

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- Practical -
  - Existing source, afterloading
  - No Organ motion
  - Short treatment times
- Physical –
  - Greater implant volume including seminal vesicles and extracapsular coverage
  - Optimization allows highly conformal dose delivery
  - Dose sculpting around OARs
- Biological –
  - Low $\alpha/\beta$ tumour – 1.5
  - Dose escalation – greater than EBRT
  - Hypofractionation
- Radioprotection –
  - Minimum isolation
  - No radioactivity within the patient
- Significantly reduced cost

# BRACHYTHERAPY - TYPES

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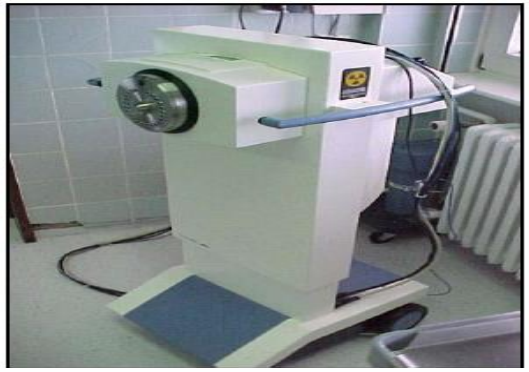

radioactive prostate seed

- TEMPORARY- HDR BRACHYTHERAPY
- Iridium 192

- PERMANENT –SEEDS LDR
- iodine 125
- palladium 103
- Caesium 131

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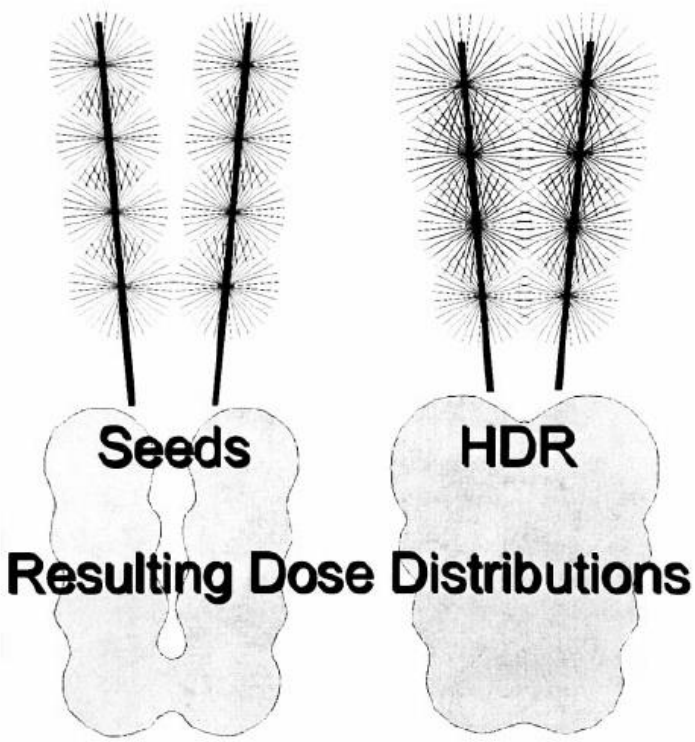
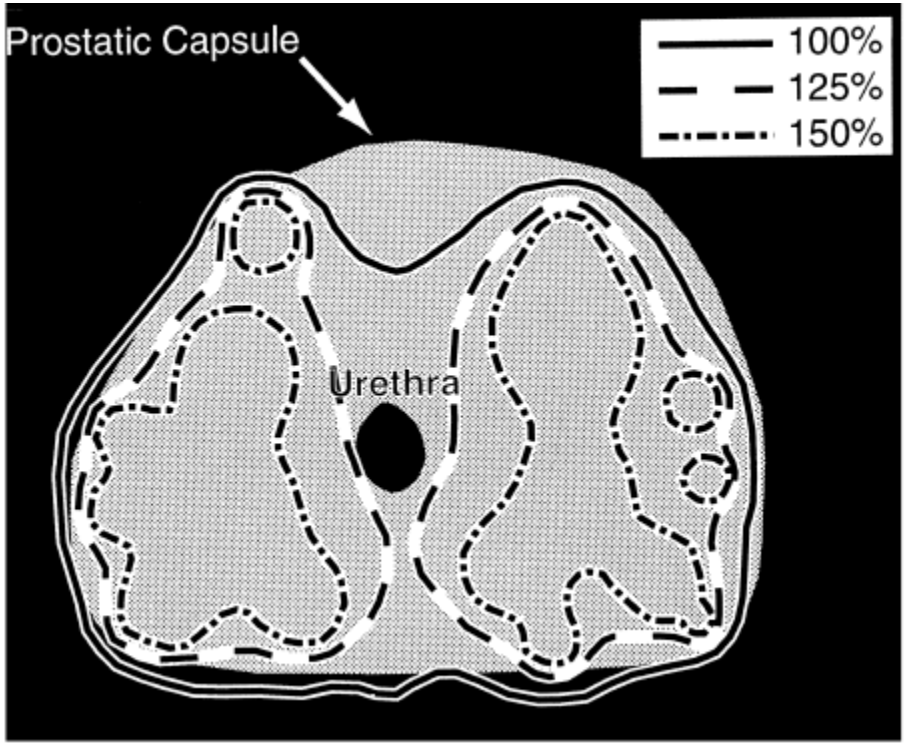
# HIGH DOSE-RATE AFTERLOADING $^{192}$IRIDIUM PROSTATE BRACHYTHERAPY: FEASIBILITY REPORT

TIMOTHY P. MATE, Int. J. Radiation Oncology Biol. Phys., Vol. 41, No. 3, pp. 525–533, 1998



| Regimen | Preferred Dose/Fractionation | NCCN Risk Group (✓ indicates an appropriate regimen option if radiation therapy is given) | | | | | |
|---|---|---|---|---|---|---|---|
| | | Very Low and Low | Favorable Intermediate | Unfavorable Intermediate | High and Very High | Regional N1 | Low Volume M1[a] |
| **EBRT** | | | | | | | |
| Moderate Hypofractionation (Preferred) | 3 Gy x 20 fx<br>2.7 Gy x 26 fx<br>2.5 Gy x 28 fx | ✓ | ✓ | ✓ | ✓ | ✓ | |
| | 2.75 Gy x 20 fx | | | | | | ✓ |
| Conventional Fractionation | 1.8–2 Gy x 37–45 fx | ✓ | ✓ | ✓ | ✓ | ✓ | |
| Ultra-Hypofractionation | 7.25–8 Gy x 5 fx<br>6.1 Gy x 7 fx | ✓ | ✓ | ✓ | ✓ | | |
| | 6 Gy x 6 fx | | | | | | ✓ |
| **Brachytherapy Monotherapy** | | | | | | | |
| LDR<br>Iodine 125<br>Palladium 103<br>Cesium 131 | 145 Gy<br>125 Gy<br>115 Gy | ✓ | ✓ | | | | |
| HDR<br>Iridium-192 | 13.5 Gy x 2 implants<br>9.5 Gy BID x 2 implants | ✓ | ✓ | | | | |
| **EBRT and Brachytherapy (combined with 45–50.4 Gy x 25–28 fx or 37.5 Gy x 15 fx)** | | | | | | | |
| LDR<br>Iodine 125<br>Palladium 103<br>Cesium 131 | 110–115 Gy<br>90–100 Gy<br>85 Gy | | | ✓ | ✓ | | |
| HDR<br>Iridium-192 | 15 Gy x 1 fx<br>10.75 Gy x 2 fx | | | ✓ | ✓ | | |

**NCCN Guidelines Version 4.2022**
**Prostate Cancer**

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# Indications for Bracytherapy

| MONOTHERAPY | BOOST after EBRT |
| --- | --- |
| Very Low | Unfavouable Intermediate |
| low | High Risk |
| Favourable Intermediate | Very High Risk |

# Contraindications

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## ABSOLUTE

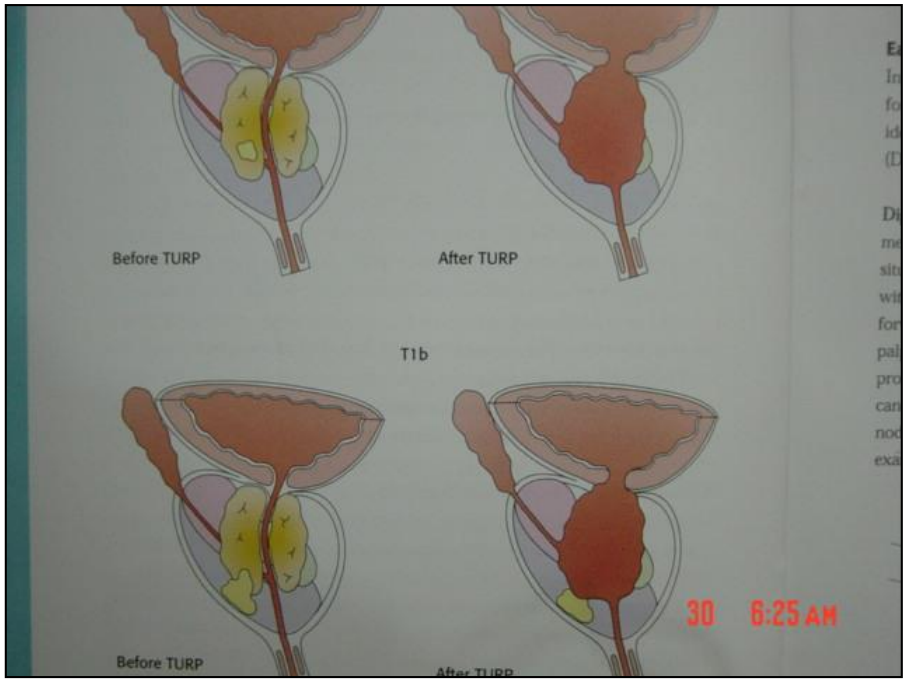
- M1 disease
- Medically unfit for anaesthesia
- Pre existing rectal fistula
- No proof of malignancy
- Ataxia telengectasia

## RELATIVE

- Gland > 60 cc
  - Preimplant cytoreduction can be achieved with ADT +- 5α-reductase inhibitor
- Pubic arch interference
- TURP last 3 months or large TURP defect
- Obstructive urinary symptoms IPSS > 15
- Peak flow rate <10ml/sec or post void residual >100cc
- Inflammatory bowel disease
- Prior rectal Surgery

# TURP

- With accurate U/S identification, a TURP defect <25% the total prostate volume and at least 1cm margin around the defect, there is a low impact on urinary function post implant
- Defect >2cc has been correlated to increase urinary morbidity compared to patients with a defect <2cc
- If a TURP is needed, it is preferably done before brachytherapy with a 3month gap before implant.

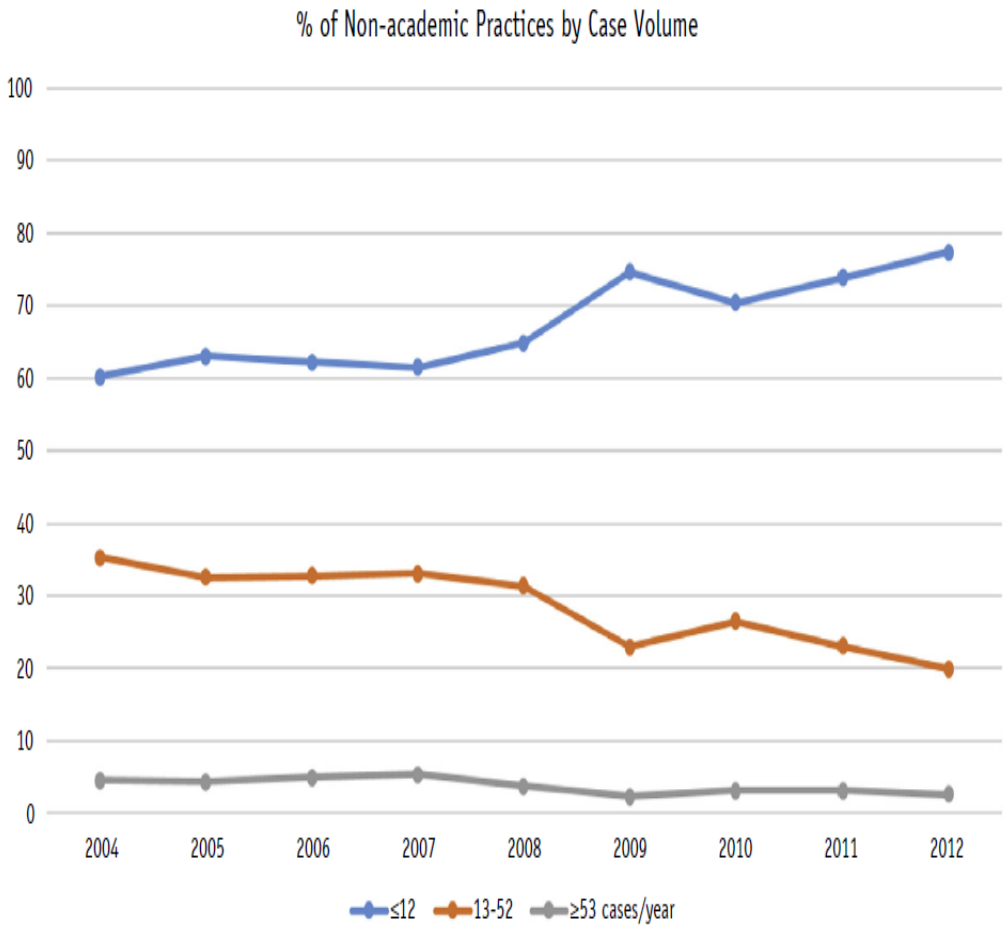


# Brachytherapy: Where Has It Gone?

Daniel G. Petereit *Journal of Clinical Oncology*, Vol 33, No 9 (March 20), 2015: pp 980-982

The decline of prostate brachytherapy with its comparable outcomes, low morbidity, and comparative cost-effectiveness poses immediate concerns related to patient choice, economic costs, and health policy. An analysis by Hayes et al[16] examined the cost of observation

- Increase in number of robotic prostatectomies
- Increase in technical sophistication of EBRT
  - IMRT, SBRT, Proton
- Reimbursement for IMRT higher
- Negative press
- Suboptimal training

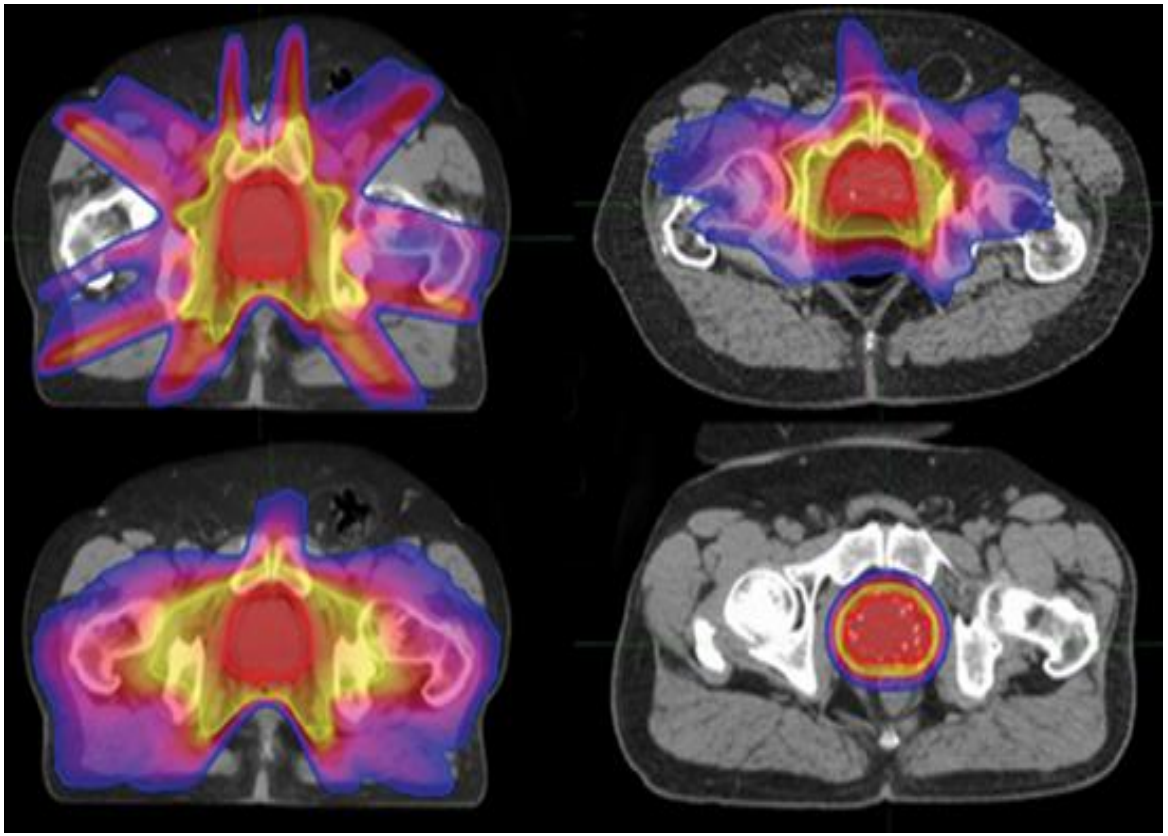



| Percentage | Number of cases |
|---|---|
| 73.7% | <12 cases |
| 24.8% | 13-53 cases |
| 1.5% | >53 cases |

# ADVANTAGES OF BRACHYTHERAPY OVER IMRT

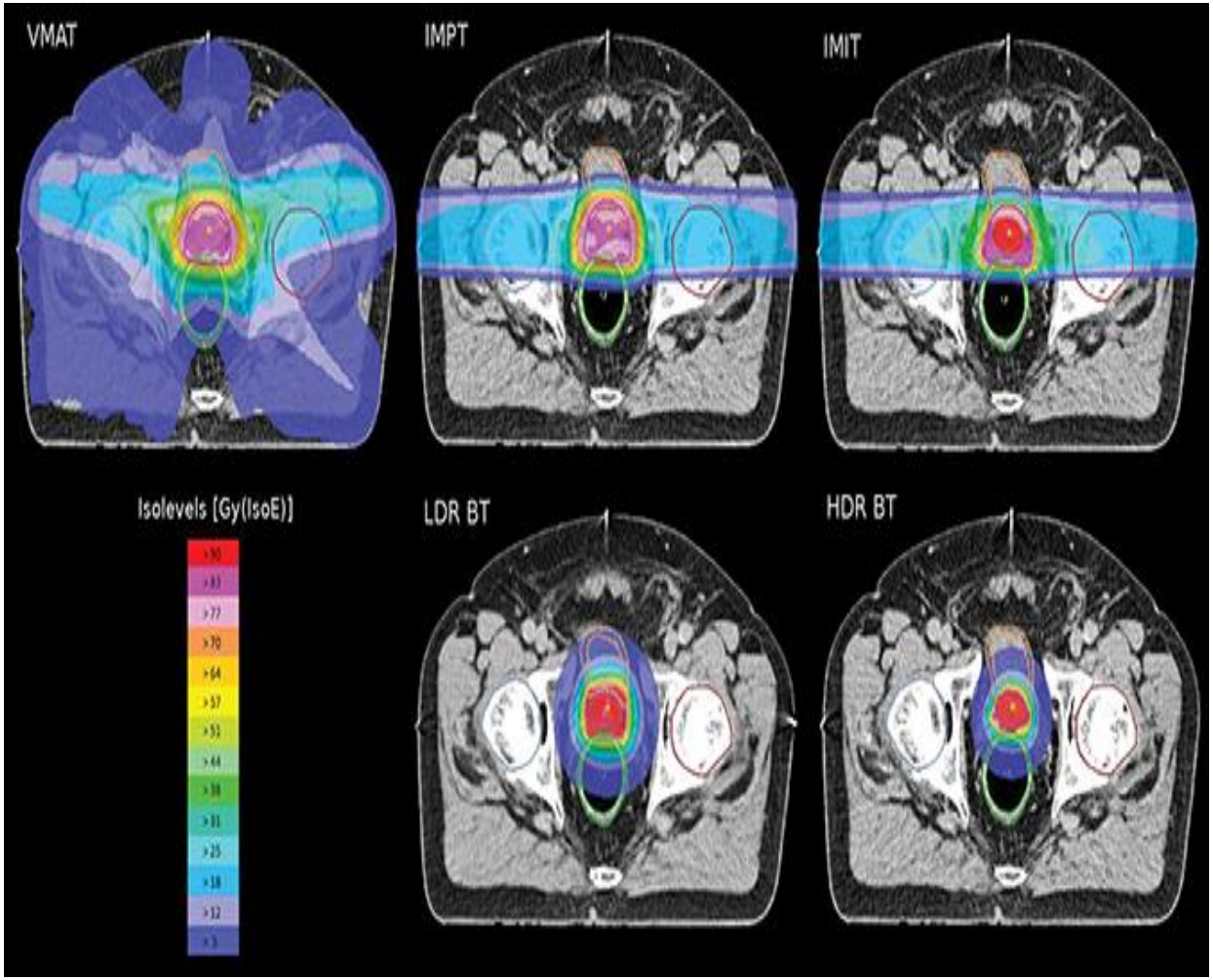
- Reduced treatment time
- Even best form of IMRT is still an XRT only.
- Radiobiologically superior
- Clinically and financially more relevant to Indian conditions

# BRACHYTHERAPY

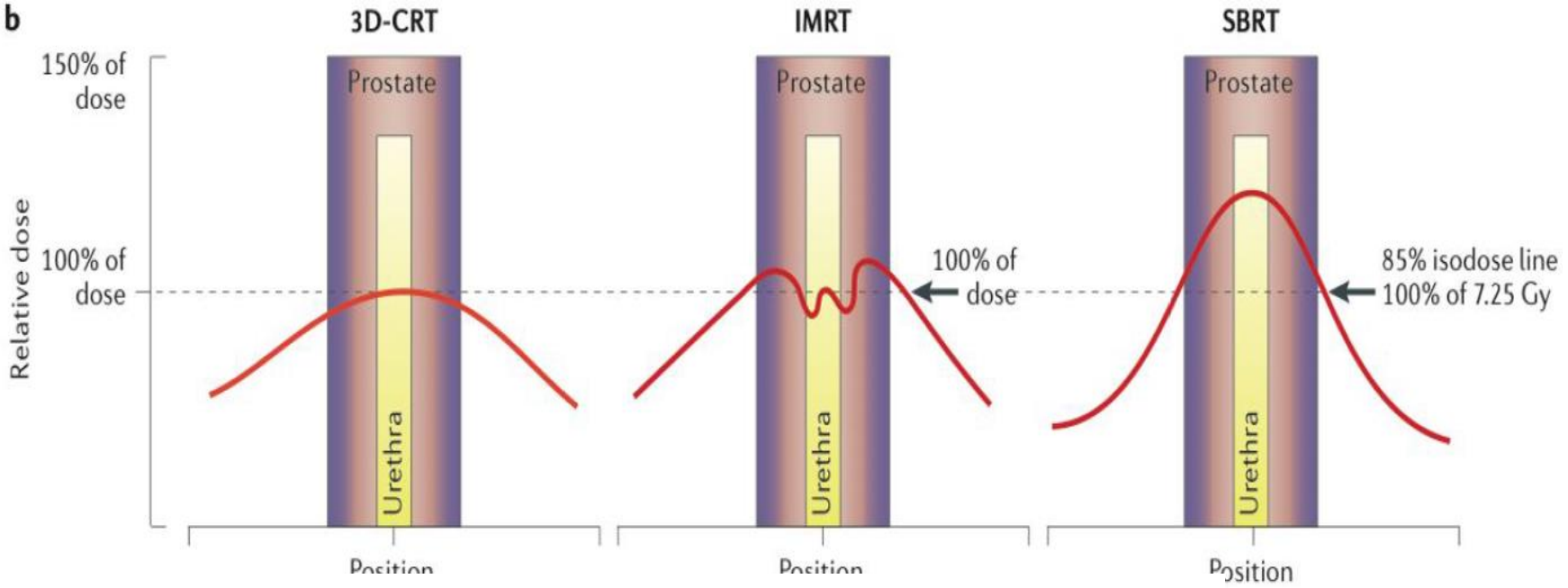


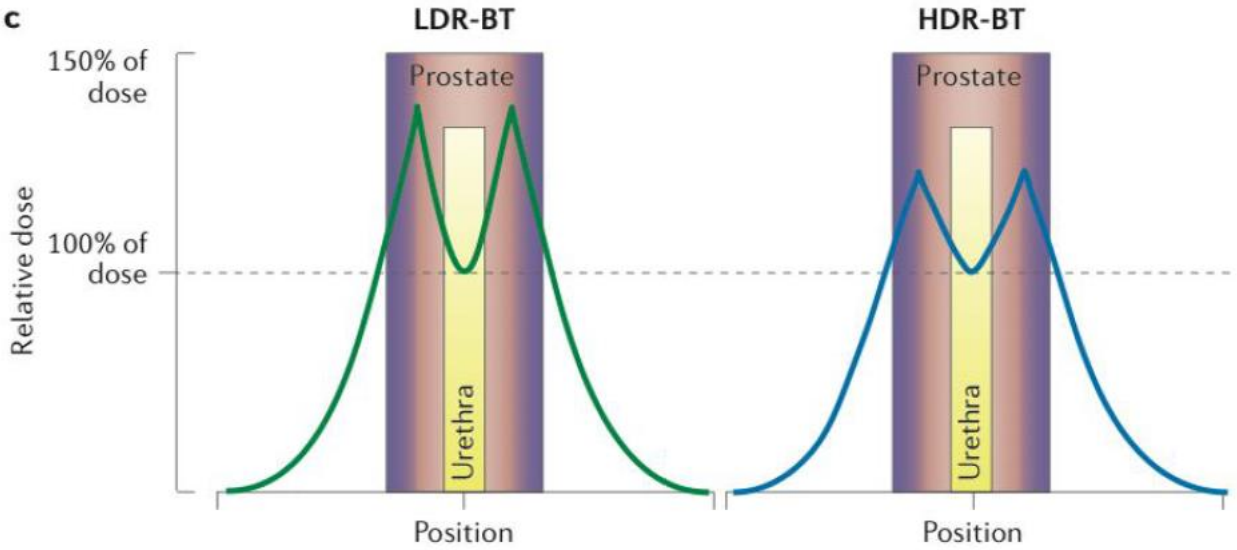
Dosimetric comparison of (A) IMRT (B) VMAT (C) (SBRT), and (D) (LDR-BT). Isodose lines correspond to 25% (blue), 50% (yellow), and 100% (red) of prescription dose.

Ibrahim Abu-Gheida

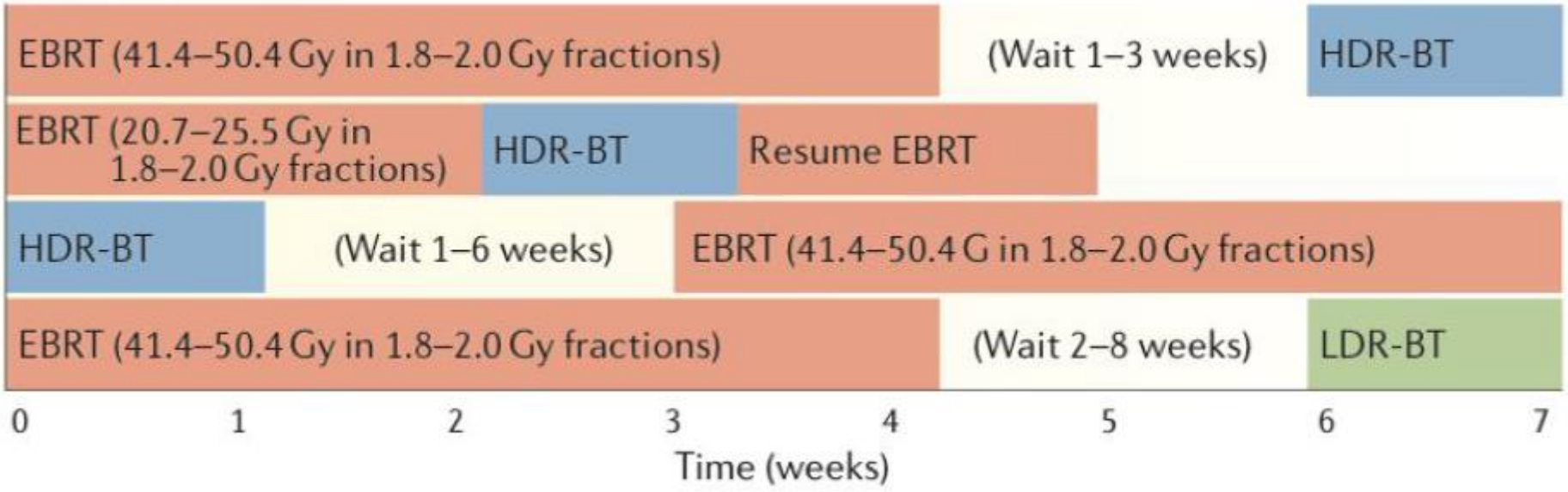



Representative dose distributions for a selected patient for all 5 treatment techniques after radiobiological conversion.


b
3D-CRT
IMRT
SBRT
150% of dose
100% of dose
Relative dose
Prostate
Urethra
100% of dose
85% isodose line
100% of 7.25 Gy
Position


c
LDR-BT
HDR-BT
150% of dose
100% of dose
Relative dose
Prostate
Urethra
Position

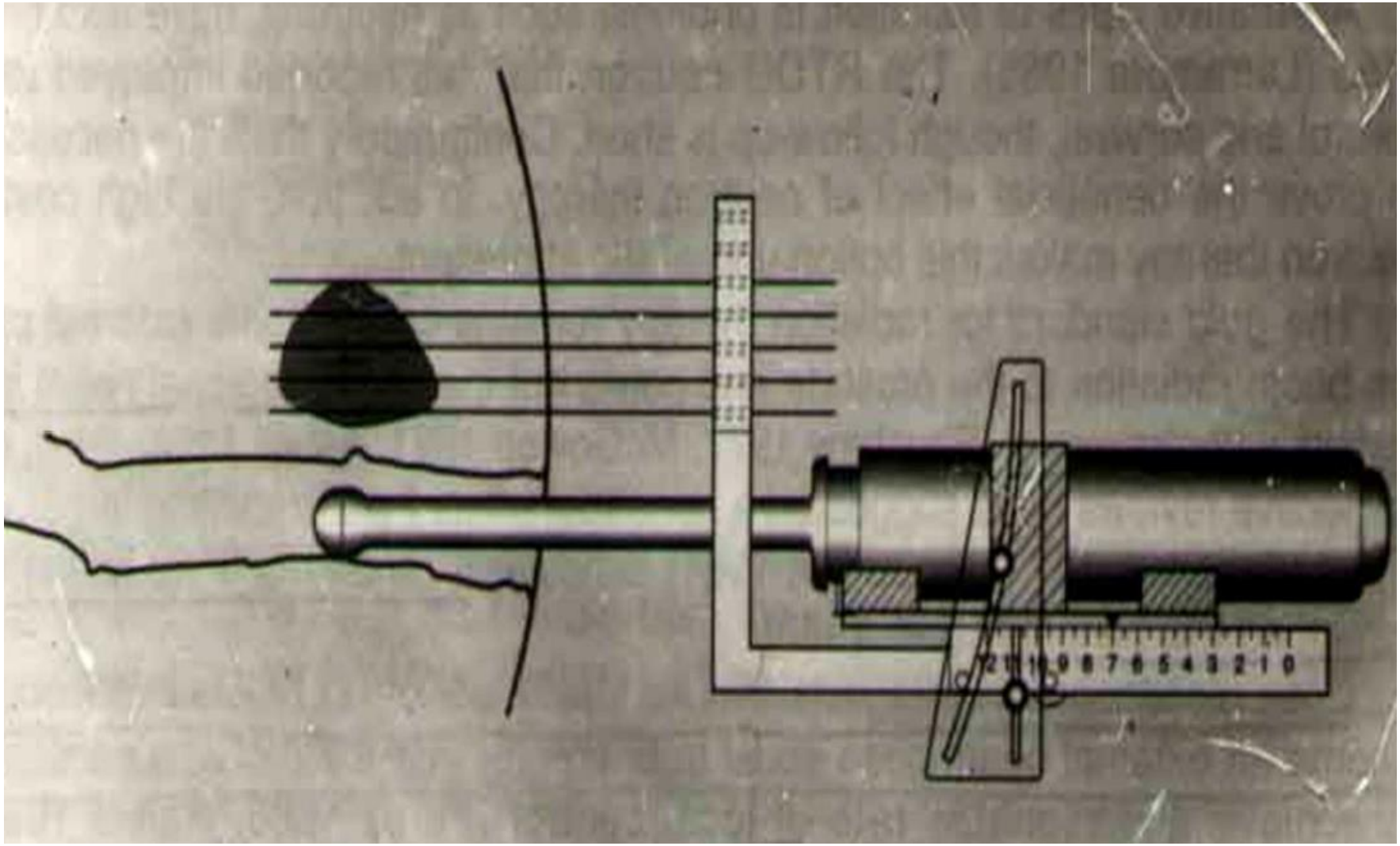
# Sequencing


EBRT (41.4–50.4 Gy in 1.8–2.0 Gy fractions)
(Wait 1–3 weeks)
HDR-BT
EBRT (20.7–25.5 Gy in 1.8–2.0 Gy fractions)
HDR-BT
Resume EBRT
HDR-BT
(Wait 1–6 weeks)
EBRT (41.4–50.4 G in 1.8–2.0 Gy fractions)
EBRT (41.4–50.4 Gy in 1.8–2.0 Gy fractions)
(Wait 2–8 weeks)
LDR-BT
0
1
2
3
4
5
6
7
Time (weeks)

# Pre- requisites

- TRUS and HDR under one roof
- Dedicated systems available but expensive

- Pre op laxatives/enema
- 3 way catheter
- TRUS in the OT- Side firing probe
- SA/EA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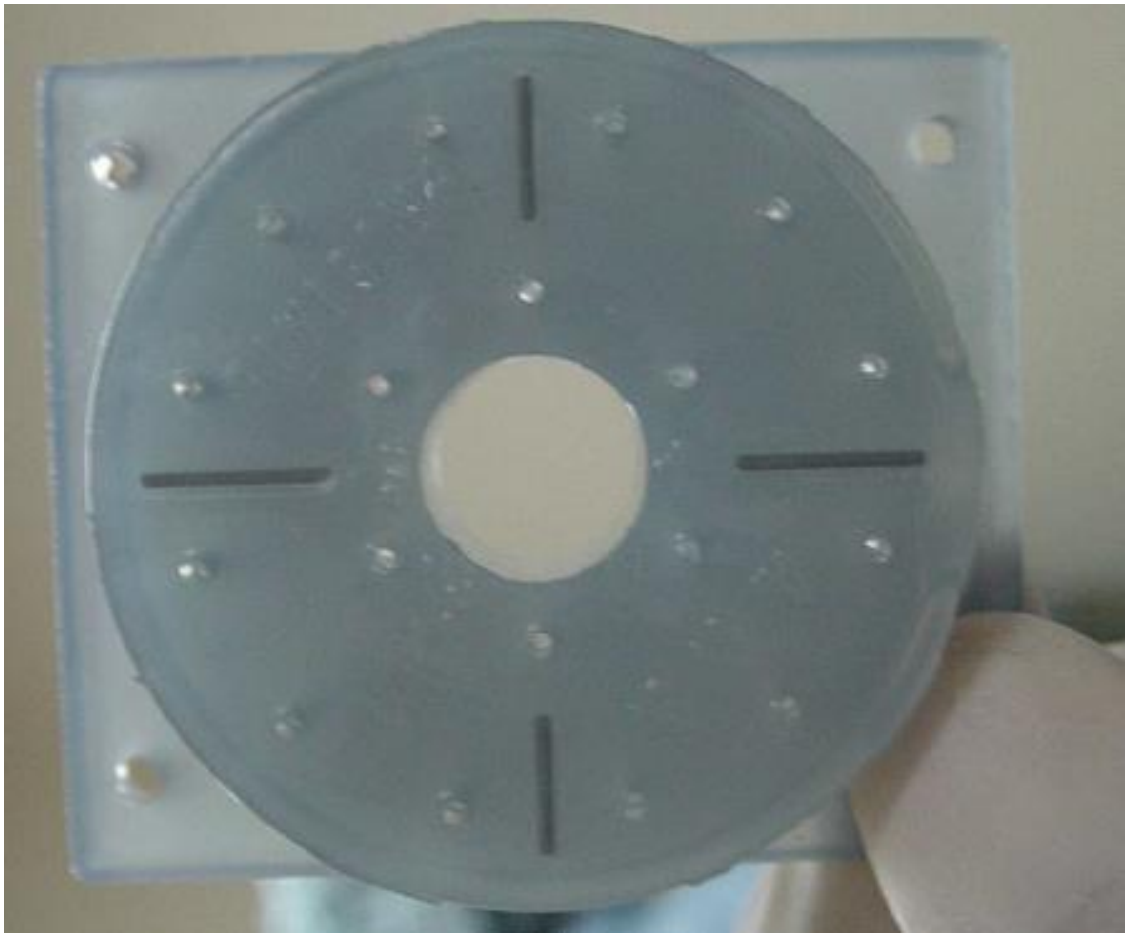
# Procedure



- SYED- NEBLETT TEMPLATE

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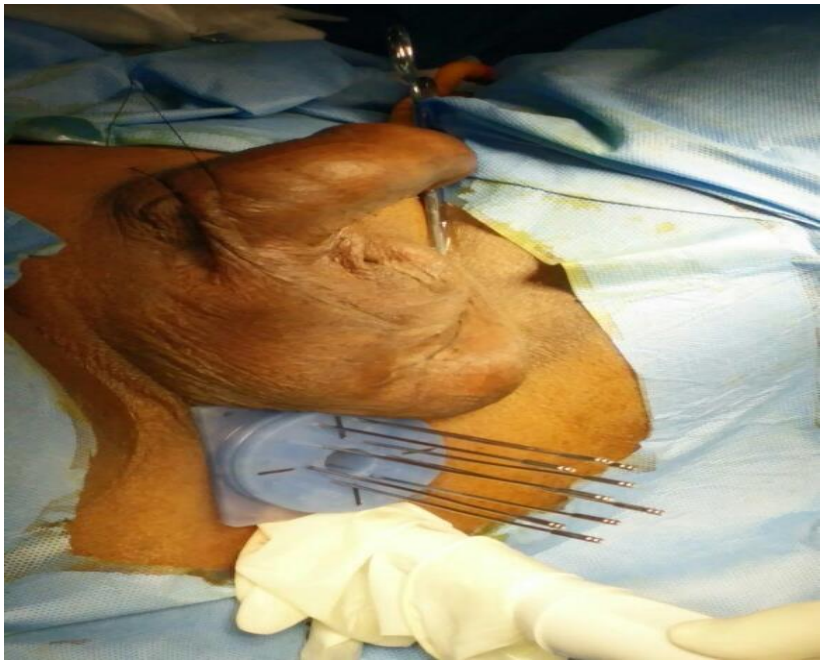

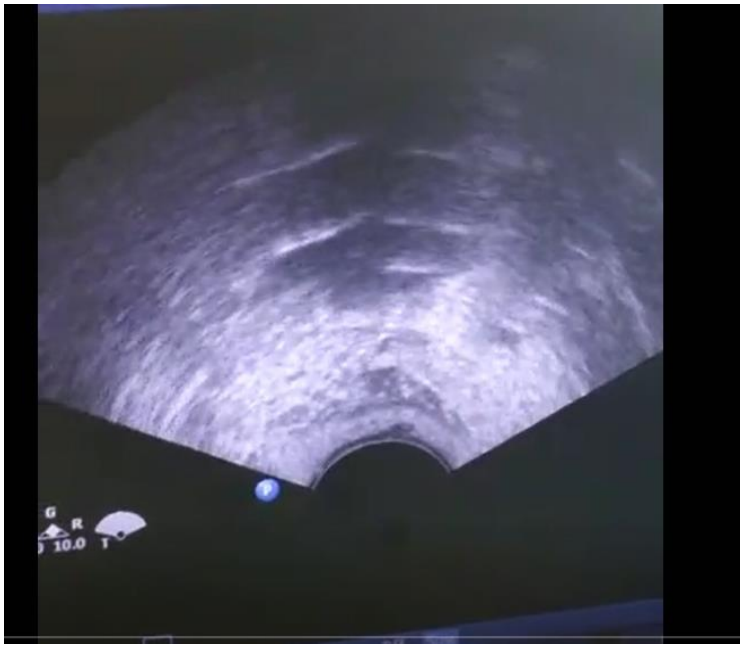

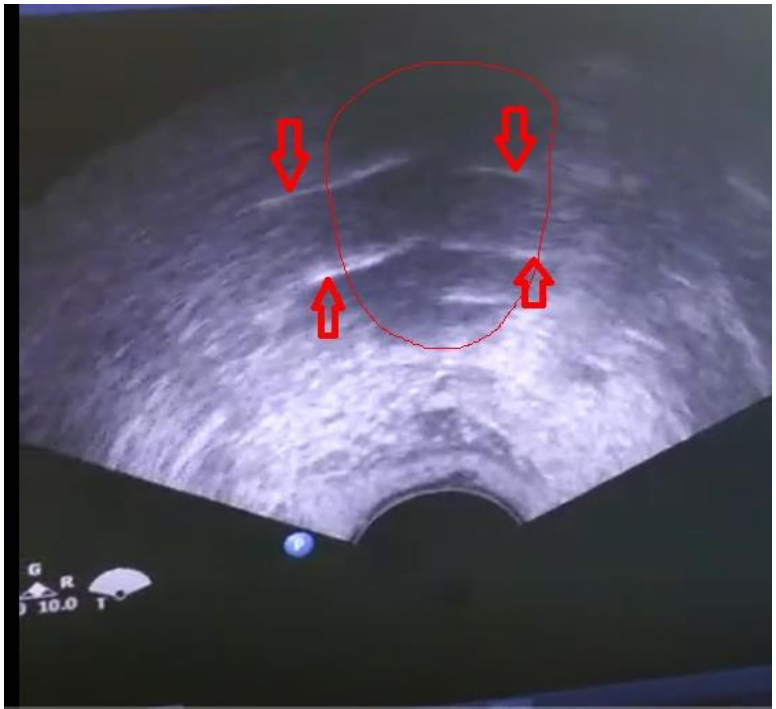

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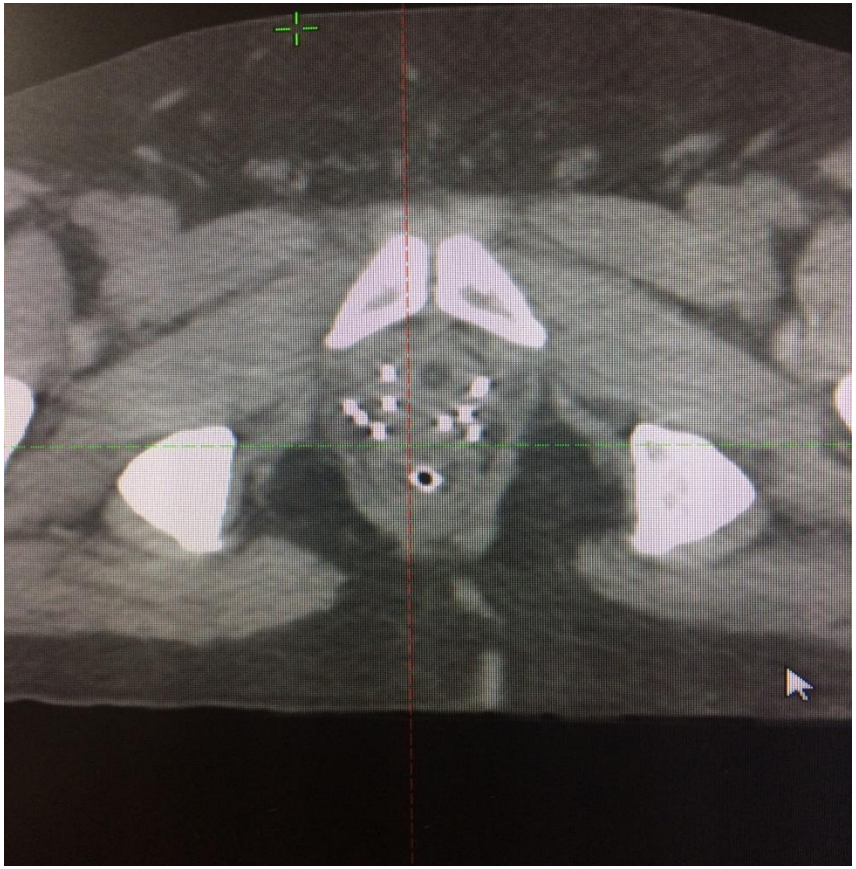

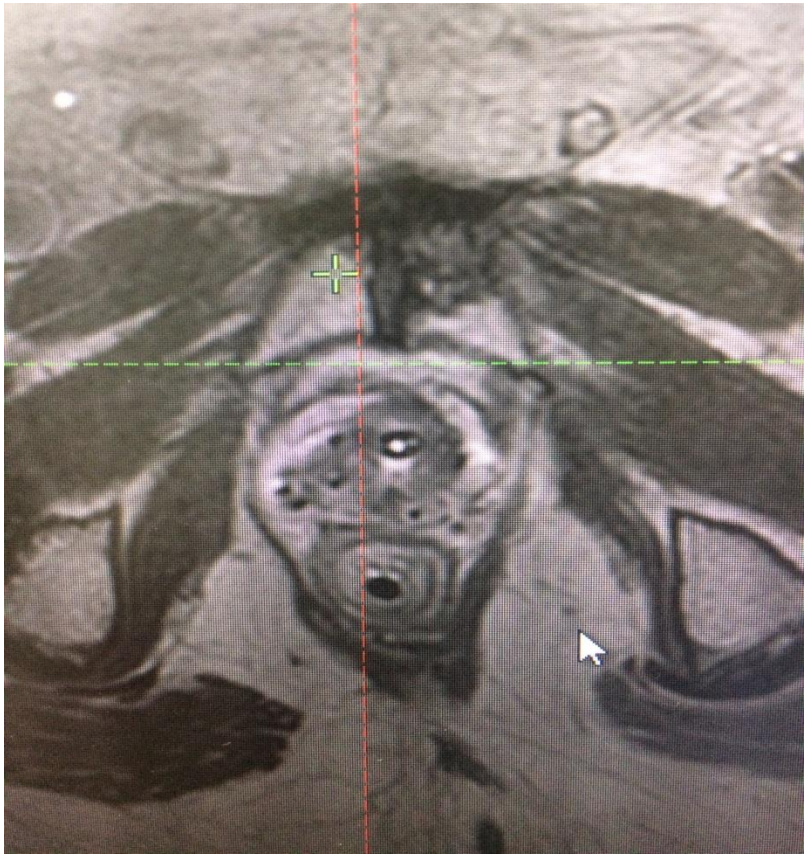

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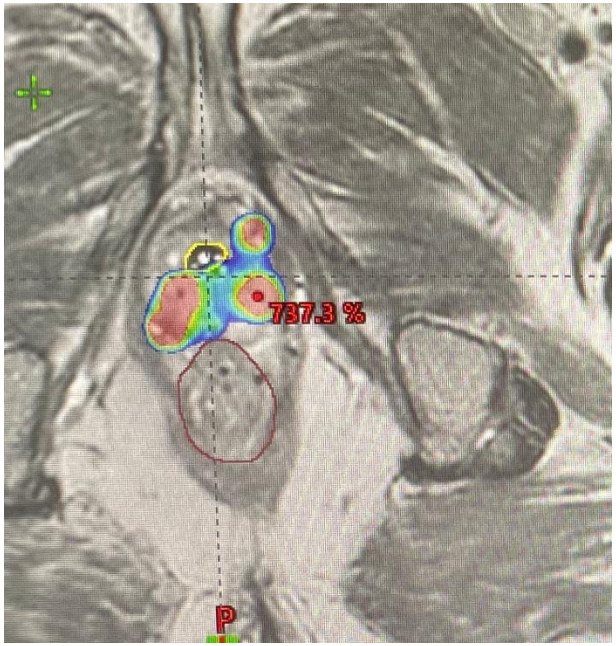


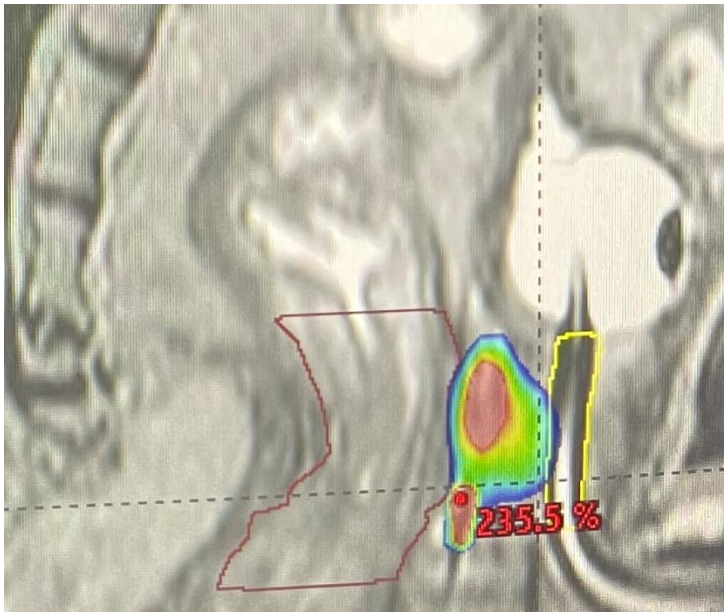


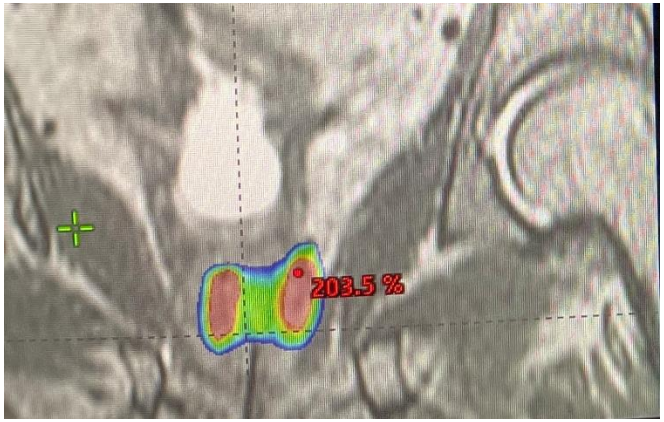

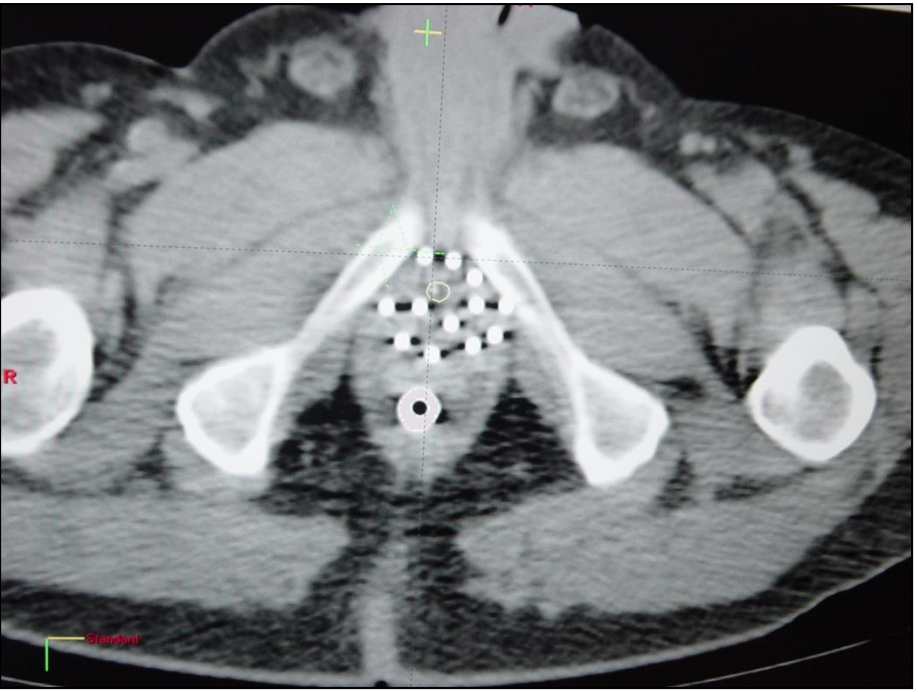


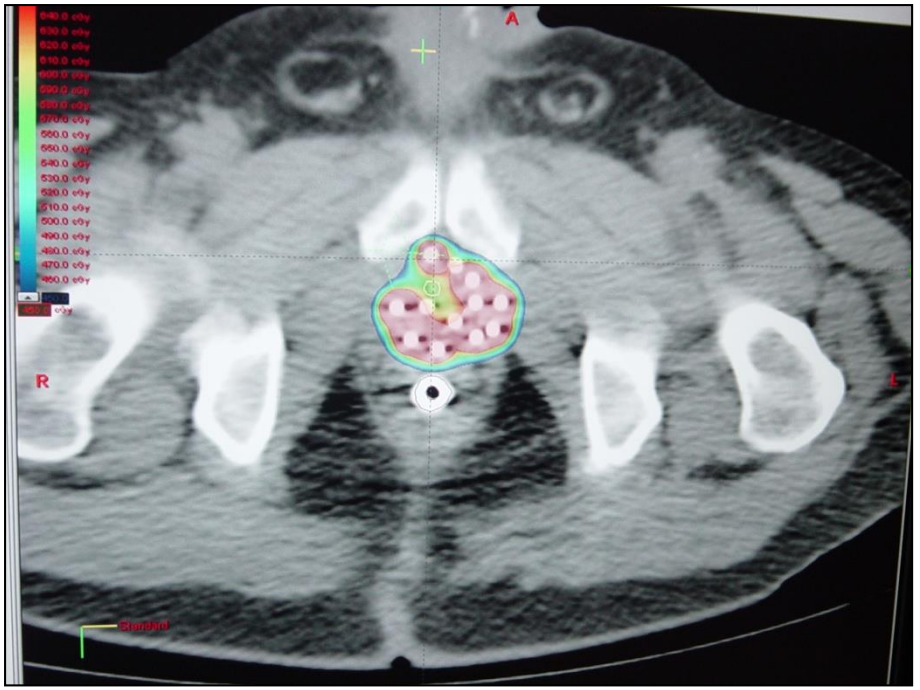


Courtesy : Dr Sanjiv Sharma – Manipal Hospital

# DOSE



Table 3
Current dose fractionation schedules

| Institution | Dose fractionation | Bladder | Urethra | Rectum |
|---|---|---|---|---|
| MSKCC | Boost 7Gyx3<br>Mono 9.5Gyx4<br>Salvage 8Gyx4 | | <120% prescription | $D_{2\ cc} < 70\%$ |
| UCSF | Boost 15Gyx1<br>Mono 10.5Gyx3<br>Salvage 8Gyx4* | $V_{75} < 1$ cc | $V_{125} < 1$ cc, $V_{150} = 0$ cc<br>*(dose tunnel whenever possible) | $V_{75} < 1$ cc |
| WBH | Boost 10.5Gyx2<br>Mono 4 × 9.5 Gy (historical)<br>12–13.5Gyx2 (current)<br>Salvage 7Gyx4 combined with hyperthermia | No constraint<br>(intra-op TRUS-based dosi) | $V_{100} < 90\%$ of prescription<br>$V_{115} < 1\%$ of prescription | $V_{75} < 1\%$ of prescription |
| TCC | Boost 6Gyx2<br>×2 implants | <80% of Rx | <125% of prescription | <80% of Rx to outer wall |
| GW | Boost 6.5Gyx3<br>Mono two sessions of 6.5Gyx3 | <100% prescription | <110% prescription | mucosa <60%, outer wall <100% |
| Toronto | Boost 15Gyx1 | n/a | $D_{10} < 118\%$<br>Max < 125% | $V_{80} < 0.5$ cc |
| UCLA-CET | Boost 6Gyx4<br>Mono7.25Gyx6 | 90–100% wall<br>80% balloon | 120% combo<br>105% any TUR<br>110% mono | Rectal wall 80%<br>Rectal wall 80–85% |

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# GEC/ESTRO recommendations on high dose rate afterloading brachytherapy for localised prostate cancer: An update

Peter J. Hoskin [a,*,1], Alessandro Colombo [b,1], Ann Henry [c,1], Peter Niehoff [d,1], Taran Paulsen Hellebust [e,1],

Radiotherapy and Oncology 107 (2013) 325–332

EBRT SCHEDULES

- 45 Gy in 25 fractions over 5 weeks.
- 46 Gy in 23 fractions over 4.5 weeks.
- 35.7 Gy in 13 fractions over 2.5 weeks.
- 37.5.Gy in 15 fractions over 3 weeks.

HDR BOOST

- 15 Gy in 3 fractions.
- 11–22 Gy in 2 fractions.
- 12–15 Gy in 1 fraction.

HDR MONOTHERAPY

34 Gy in 4 fractions.
36–38 Gy in 4 fractions.
31.5 Gy in 3 fractions.
26 Gy in 2 fractions.

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## OAR CONSTRAINTS

- Rectum: D2 cc $\leqslant$ 75 Gy $EQD_2$
- Urethra:
  - D0.1 cc = $\leqslant$120 Gy $EQD_2$
  - D10 $\leqslant$ 120 Gy $EQD_2$
  - D30 $\leqslant$ 105 Gy $EQD_2$

## RECURRENT PROSTATE

36 Gy in 6 fractions [44].
21 Gy in 3 fractions [45].
30 Gy in 2 fractions to peripheral zone after 30–40 Gy external beam [46].

# ACR Appropriateness Criteria high-dose-rate brachytherapy for prostate cancer

I-Chow Joe Hsu[1,*], Yoshiya Yamada[2], Dean G. Assimos[3], Anthony V. D'Amico[4],



Table 1
Sixty-year-old man, stage T3b, Gleason score 7, adenocarcinoma

| Treatment | Rating | Comments |
|---|---|---|
| EBRT 45 Gy + HDR brachytherapy 5.5–6.5 Gy × 3 | 7 | |
| EBRT 45 Gy + HDR brachytherapy 8–11.5 Gy × 2 | 8 | The panel felt the 2-fraction regimen has the best supporting evidence for this patient, who has a history of TURP and SV invasion. |
| EBRT 45 Gy + HDR brachytherapy 13–15 Gy × 1 | 5 | |

Table 2
Fifty-year-old man, stage T1c, Gleason score 3/3, adenocarcinoma

| Treatment | Rating | Comments |
|---|---|---|
| HDR monotherapy 9.5 Gy × 4 | 7 | Although there is a trend toward more hypofractionated monotherapy regimens, the panel felt the more fractionated regimens have a longer followup and stronger evidence for routine use. |
| HDR monotherapy 10.5 Gy × 3 | 5 | |
| HDR monotherapy 13.5 Gy × 2 | 5 | |
| HDR monotherapy 19 Gy × 1 | 3 | |

# American Brachytherapy Society consensus guidelines for high-dose-rate prostate brachytherapy

Yoshiya Yamada[1,*], Leland Rogers[2], D. Jeffrey Demanes[3], Gerard Morton[4]

Brachytherapy 11 (2012) 20–32

**RESULTS:** Despite a wide variation in doses and fractionation reported, HDR brachytherapy provides biochemical control rates of 85–100%, 81–100%, and 43–93% for low-, intermediate-, and high-risk prostate cancers, respectively. Severe toxicity is rare, with most authors reporting less than 5% Grade 3 or higher toxicity. Careful attention to patient evaluation for appropriate patient selec-

**CONCLUSION:** The clinical outcomes for HDR are excellent, with high rates of biochemical control, even for high-risk disease, with low morbidity. HDR monotherapy, both for primary treatment and salvage, are promising treatment modalities. 

# BRACHYTHERAPY DOSE

Sri Shankara CANCER HOSPITAL & RESEARCH CENTRE

## Monotherapy

- LDR
  - I-125 – 145Gy
  - Pd-103- 125Gy
  - Cs-131- 115Gy

## Monotherapy

- HDR
  - Ir-192
    - 13.5Gy x 2
    - 9.5Gy BID x2

# BRACHYTHERAPY DOSE

Sri Shankara CANCER HOSPITAL & RESEARCH CENTRE

## BOOST

- LDR
  - I-125 –100-115 Gy
  - Pd-103- 90-100 Gy
  - Cs131-85 Gy

## BOOST

- HDR
  - Ir-192
    - 15Gy x 1
    - 10-11Gy x2

# Personal Practice

- HDR 11.5Gy x 2 fractions
- EBRT 50 Gy /1.8 – 2.0 Gy / FRACTION

- Max. urethral dose </= 120% MPD
- MPD allowed to indent few mm anteriorly
  but still covered by 80% isodose
- Higher doses to posterolateral portions (anatomic rationale) 150-200%
- Rectal dose </= 75%

# RESULTS

## Long-term outcomes of high-dose-rate brachytherapy for intermediate- and high-risk prostate cancer with a median follow-up of 10 years

John W. Yaxley*,†, Kevin Lah†,‡, Julian P. Yaxley§, Robert A. Gardiner†,¶, Hema Samaratunga** and James MacKean*

*BJU Int* 2017; **120**: 56–60

| bNED | INTERMEDIATE RISK | HIGH RISK |
|---|---|---|
| 5 YEARS | 93.3 | 74.3 |
| 10 YEARS | 86.9 | 56.1 |

| | |
|---|---|
| URETHRAL STRICTURE | 4.2 % |
| 10yr actuarial cancer specific survival | 90.8 % |
| Actuarial overall survival rate | 86.7 % |

Table 5: Clinical results after HDR brachytherapy alone for patients with low- and intermediate-risk prostate cancer.

| Author | Number of patients | Free biochemical reccurence (%) | Cause specific survival (%) | Local control (%) | Years after diagnosis |
|---|---|---|---|---|---|
| Demanes et al. [63] | 298 | 94 | 100 | 100 | 5 |
| Ghilezan et al. [64] | 95 | 98 | 100 | 100 | 5 |
| Grills et al. [65] | 65 | 98 | — | — | 3 |
| Mark et al. [66] | 206 | 89 | — | — | 5 |
| Rogers et al. [67] | 328 | 96 low risk<br>89 intermediate risk | 100 | — | 3 |
| Yoshioka et al. [68] | 111 | 100 low risk<br>89 intermediate risk | — | 100 | 3 |

Advances in Urology
Volume 2009, Article ID 327945, 11 pages

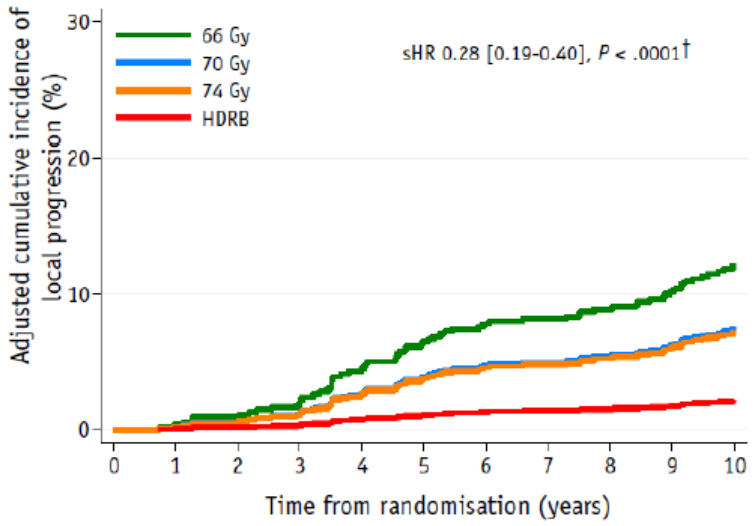
**Table 3.** Published Studies on the Use of High-Dose Rate Brachytherapy in Locally Advanced Prostate Cancer–Patient Characteristics/Outcome

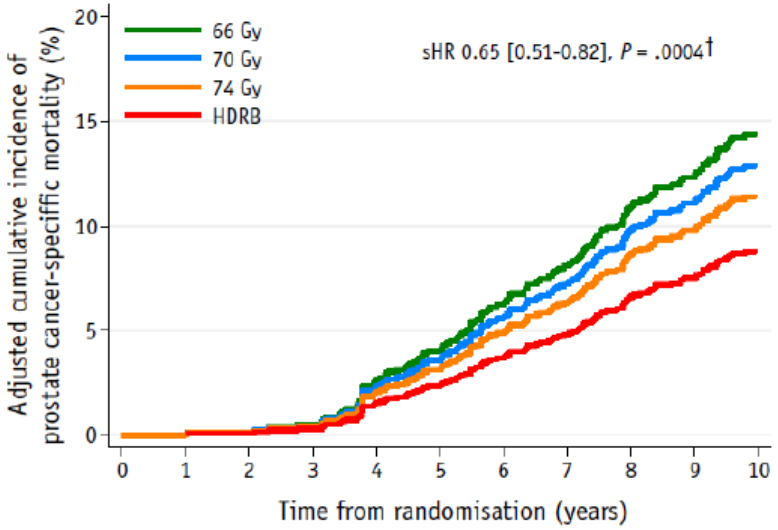
| *Group* | *No. of Pts* | *T-Stage (%)* | *PSA* | *Median Follow-up (months)* | *Biochemical Control (%)* | *Failure Definition* | *OS (%)* |
|---|---|---|---|---|---|---|---|
| William Beaumont Hospital[2] | 207 | T1c-T3c | 11.5 (Mean) | 52.8 | 74 | ASTRO Consensus Panel | 91.6 |
| Seattle Prostate Institute[28] | 104 | T1b-T3c | 12.9 (Mean) | 45 | 85 | 3 rises | NS |
| Kiel, Germany[32] | 144 | T1b-T2a (20)<br>T2b-T3 (80) | 25.6 (Mean) | 96 | 74 | 3 rises all >1 ng/mL | 71.5 |
| California Endocurietherapy Cancer Center[29] | 110 | T1b-T3c | NS | 36 | 85 | >1.5 ng/mL | NS |
| Goteburg, Sweden[27] | 50 | T1-T2 (74)<br>T3 (26) | NS | 45 | 78<br>T1 100 | >1.0 ng/mL | 96 |
| Berlin, Germany[30] | 230 | T2 (34.8)<br>T3 (58.3) | 12.8 (median) | 40 | T2 75<br>T3 60 | ASTRO Consensus Panel | 93 at 5 yr |
| Munich, Germany[24] | 40 | T2 (45)<br>T3 (42.5) | 40.7 | 74 | 79.5 | Local Control | 87.5 |
| Lahey Clinic[25] | 61 | T1-T2<br>T1c (14) | 10.4 (mean) | 11.8 | 92.2 | 3 rises | 98 |
| Long Beach Memorial Medical Center[23] | 200 | T2a (32.5)<br>T2b (32)<br>T3a-b (21.5) | 10 | 24 | 97 | ASTRO Consensus Panel | 97 |

# TROG 03.04 RADAR Trial

**David Joseph** Int J Radiation Oncol Biol Phys, Vol. 106, No. 4, pp. 693–702, 2020

High Risk – Brachytherapy Boost




HDR Brachy + AS – superior

HDR boost superior to dose escalation by EBRT

# Reirradiation

**A Systematic Review and Meta-analysis of Local Salvage Therapies After Radiotherapy for Prostate Cancer (MASTER)**

EUROPEAN UROLOGY 80 (2021) 280–292

| Modality | 5y RFS | GU toxicity | GI toxicity |
|---|---|---|---|
| **RP** | 53% | 21% | 1.5% |
| **Cryo** | 57% | 15% | 0.9% |
| **HIFU** | 46% | 23% | 0.8% |
| **SBRT** | 56% | **5.6%** | 0.0% |
| **HDR** | 58% | **9.6%** | **0.0%** |
| **LDR** | 53% | **9.1%** | 2.1% |

- Five-year RFS was similar across modalities on meta-regression, although differences in severe GU and GI toxicity appear to favor reirradiation, particularly HDR brachytherapy.

*Luca F. Valle*

EUROPEAN UROLOGY 80 (2021) 280–292

# Toxicity - Acute Symptoms

- Dysuria
- Hematuria
- Perineal hematoma (< 3 % )
- Obstruction- Urethral Stricture (5-12%)
- Perineal Pain (< 5%)
- Rectal urgency and frequency (< 10%)

# Delayed Complications

- Chronic cystitis (3-7 %)
- Incontinence (1% for non-TURP, 25-42% for TURP)
- Rectal ulceration (< 1 %)
- Urethral necrosis (< 1 %)
- Erectile dysfunction (> 70y/o, 20-25%;< 70y/o, 10-15%)

Table 1

HDR monotherapy vs. $^{103}$Pd monotherapy

| Toxicities | HDR (%) | $^{103}$Pd (%) | |
|---|---|---|---|
| Acute dysuria (Grades 1–3) | 36 | 67 | $p < 0.001$ |
| Acute urinary frequency/urgency | 54 | 92 | $p < 0.001$ |
| Urethral stricture | | | |
| Chronic urinary frequency/urgency | 32 | 56 | $p < 0.001$ |
| Urethral stricture | 8 | 3 | |
| Three-year impotency rate | 16 | 45 | |

Most of above toxicities were Grade 1.

No difference in chronic dysuria, incontinence retention, and hematuria.

# Conclusion

- Evidence strongly suggest that prostate BT can be used as definitive treatment or as a boost to external beam radiotherapy

- Associated with
  - excellent local control,
  - Biochemical disease-free survival,
  - excellent post-treatment health-related quality of life

- Mainstream therapeutic option for low- to-intermediate risk disease

# THANK YOU