

Prostate HDR Treatment Brachytherapy Planning - Considering Different Imaging Modalities

Introduction – J Prisciandaro
Ultrasound based – Z Chang
CT based – J Zoberi
MRI based – F Mourtada

Prostate Cancer

- Treatment Options:
 - Surgery (Radical prostatectomy)
 - Radiation therapy
 - Hormone therapy
- Choice of treatment modality(s) dependent on:
 - Stage
 - PSA
 - Gleason score

Radiotherapy Options

- External beam
 - 3D conformal photon therapy
 - Intensity Modulated Radiotherapy
 - Stereotactic Body Radiotherapy
 - Proton therapy
- Brachytherapy
 - Low dose rate (LDR)
 - High dose rate (HDR)

Combination Therapy

- Several institutional series^{1,2} as well as the ASCENDE-RT³ randomized trial (intermediate and high risk) have suggested an improvement biochemical control in patients receiving EBRT + LDR.
 - Additional follow-up is needed to evaluate metastasis-free survival, prostate cancer-specific mortality, and overall survival.
- A similar effect is expected for patients receiving EBRT + HDR, but clinical data is sparse.⁴

1. Liss, A.L. *et al.*, *Brachytherapy*, 2015, 14(4): 502-10.
2. Spratt, D.E. *et al.*, *BJU Int*, 2014, 114 (3): 360-7.
3. <http://meetinglibrary.asco.org/content/141698-159>
4. Smolska-Ciszewska *et al.*, *Radiation Oncology*, 2015, 10:60.

HDR vs. LDR Brachytherapy

Advantages

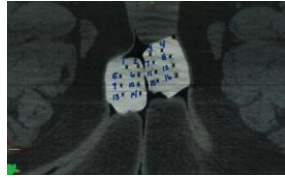
- Reduced exposure to staff
- No exposure to families and friends
- Ability to shape dose cloud
- Ability to cover base of SV
 - Source migration not an issue
- Reusable source
- Potential biologic advantage with HDR brachytherapy

Disadvantages

- Higher initial investment
- Multiple fractions require hospitalization
- Needle migration documented with multiple fraction implants
- More labor intensive
 - Relatively complicated treatment system – more interlocks. QA process much more difficult.

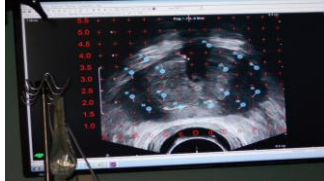
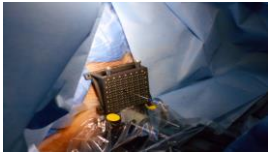
HDR Imaging/Planning Options

1. CT based prostate HDR



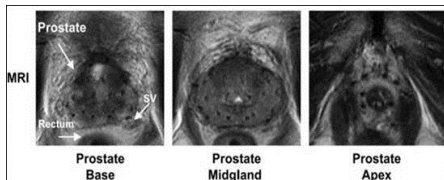
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2. US based prostate HDR



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3. MRI based prostate HDR



Courtesy of
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