

Common Errors Found in Low Dose Rate (LDR) Prostate Credentialing

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Introduction

The Radiological Physics Center (RPC) has performed LDR prostate credentialing of teams comprised of a radiation oncologist and physicist wanting to participate in LDR prostate clinical trials over the past 14 years. The purpose of credentialing is to verify that the radiation oncologist and other personnel involved are capable and familiar with the protocol prior to enrolling patients with the goal of reducing the number of deviations. The RPC has compiled the most common errors determined from the dosimetry and clinical reviews which resulted in an unacceptable LDR prostate credential.

Methods (cont'd)

2. The Facility questionnaire includes information about personnel that are responsible for implants, data related to treatment planning system, isotope types, model, and seed quality assurance processes.



Methods (cont'd)

5. Dry-Run Cases are a Pre-implant and Post-implant plans of a previous patient treated in similar fashion to the protocol. The clinical evaluation review of the Dry-Run is to compare parameters between the pre-implant and post-implant, which includes: prostate volumes, lengths, V100, D90, R_{100} , source type and activity, implant patterns, contouring of the tumor volume (PTV/ CTV), and critical structures.

Results

The RPC has reviewed 413 LDR prostates credentialing submissions. Of these, 65% of the applications are not approved with their first submission. Common clinical errors found include:

- ETV outlined was too small
- Prostate contours were inaccurate
 No PTV drawn on ultrasound
- Apex and/or Base not covered

Methods

LDR prostate credentialing requires that the following be completed: Knowledge Assessment, with an attestation that the Radiation Oncologist and Physicist have treated 10 or more patients utilizing this technique, Facility Questionnaire, 2 benchmark cases (single seed and geometric benchmark case) and a previous patient case treated in similar fashion to the protocol. The two benchmark cases are recalculated by the RPC using the most up to date TG-43 parameters. The previous patient case is reviewed by a Radiation Oncologist.

Address:	
Is this Facility also known by other name(s)? If so, ple	ase provide:
· · · · · · · · · · · · · · · · · · ·	
PERSONNEL CONTACT INFORMATION	
A. Radiation Oncologist Responsible for Implant Patients	
Name:	Phone:
Address:	Fax:
	E-mail:
B. Chair/Chief of Radiation Oncology	
Name:	Phone:
Address:	Fax:
	E-mail:
C. Physicist Responsible for Implant Patients	
Name	Phone
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	E-mail:
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D. Dosimetrist Responsible for Implant Patients	
Name:	Phone:

3. Reference case 1 is a single seed, strength 0.5U for I125 use 2.5U for Pd103





Figure 5: Pre-implant UltraSound



adequately

- Implanted seeds located outside the prostate
- V100 coverage < 90-95%
- R₁₀₀ > 1cc
- Post implant done > 30 days from implant
- Seeds implanted in row D
 D90 > 130%
- D90 < 90% and high source activity used per seed.



1. The Knowledge Assessment (KA): RTOG requires that the prostate team must have performed at least 10 TRUS guided prostate implants. At the bottom of the KA Form (figure 1) you will be asked to attest to this by your signature.

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THOWLED			
			<u> </u>
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Physicist	Radiation Oncologist		
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Protocol Specifications:			
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Figure 3: Reference Case 1 – Single Seed

4. Reference case 2 is a geometric case. A diagram on how to do this case can be found on the RPC's website at rpc.mdanderson.org

VariSeed: Therapy Visualization Report [Page 5] M. D. Anderson Cancer Cener · 8/1/2013 7:42:46 AM					
Name: Test case2 PID: Case 2 Dept. ID:	Study: Case2 I-125 (1251L) Variation: Default Images: 9 Template: B-K Standard		Source: I-125 (I125-SL) _ RPC Comment: Sources: 81 Anisotropy: Factors (Point Model) Source Activity: 0.500 U [0.394 mCi]		
Procedure Date: 7/19/2012	Prescrip	tion Dose: 145.0 Gy	Total Activity: 40.500 U [31.890 mCi]		
dose Legend [% of Prescription Dose]	290.00 [200.00%] 217.00 [149.66%] 145.00 [100.00%]	130.00 [89.66%] 73.00 [50.34%] 36.00 [24.83%]			
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Figure 6: Post – implant CT

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	V150: V120: V100: V90:	24.01 cc 48.04 cc 55.95 cc 56.01 cc	[42.87%] [85.77%] [99.90%] [100.00%]			V200%: V150%: V120%:	6.58 cc 20.53 cc 40.74 cc	[12.64%] [39.42%] [78.20%]		
	D100:	135.79 Gy	[93.65%]			V100%: V90%:	50.85 cc 51.57 cc	[97.61%] [98.99%]		
	D50:	209.19 Gy	[144.27%]			D100%: D90%:	91.41 Gy 160.73 Gy	[63.04%] [110.85%]		

Figure 8: Percentage of clinical errors found

The Common dosimetric errors found in the reference cases include:

- source dosimetry parameters not updated to the most current values from TG-43 Update
- prostate not contoured accurately
 rectum not contoured accurately
 incorrect source activities used.

Conclusions

The LDR prostate credentialing process

