| TITLE: | Prostate Brachytherapy Procedure |
| DEPARTMENT: | Cancer Management |
| EFFECTIVE DATE: | 3/1/13 |

**SCOPE:**  
Camden Clark Medical Center

**PURPOSE:**  
To provide guidelines for prostate brachytherapy which include scheduling and steps taken before, during, and after the procedure to include education, safety, and coordination with other physicians and hospital departments.

**PROCEDURE:**

**A. Prior to Scheduling Prostate Brachytherapy**

1. The nurse receives order from Radiation Oncologist to schedule patient for procedure after Volume Study has been completed and data reviewed by Radiation Oncologist.

2. Radiation Oncology Nurse will ensure patient receives Prostate Brachytherapy Information Booklet and Pre-operative Instruction Sheet (see attached)

   Radiation Oncology Nurse will inquire when Radiation Oncologist prefers to schedule case, which urologist will be assisting him, and type of anesthesia preferred.

   Radiation Oncology Nurse will notify Radiation Oncology Coordinator via the flow sheet.

**B. Scheduling Responsibilities**

1. Radiation Oncology Nurse will notify urologist's office. Once the urologist's preferred date and time of surgery is established, the nurse will notify the Radiation Oncology Coordinator to schedule with surgery and admitting.

   If urologist is unavailable to perform procedure, the Radiation Oncologist and Radiation Physicist will be notified as soon as possible.

   Radiation Oncology Coordinator will notify appropriate staff via computer.
2. Radiation Oncology Coordinator will send the flow sheet information to the Dosimetrist to hold until completion of procedure.

Radiation Oncology Coordinator will bill the radioactive seeds and write in amount billed on flow sheet upon completion of the brachytherapy procedure.

Radiation Oncology Coordinator will file the completed flow sheet.

C. Patient Education

1. Radiation Oncology Nurse will send/give patient pre-op instruction information sheet, and prostate brachytherapy information booklet and verify patient has received and read information by contacting patient via telephone with documentation in nurses notes.

2. Per the instruction of the radiation oncology nurse, the unit clerk will schedule a follow up appointment for the patient two days prior to the scheduled procedure for radiation safety/discharge instructions and to ensure patient complies with surgical prep (clear liquids 18 hours prior and Fleets prep kit on hand to use - see form).

D. Surgical Procedure

1. Radiation Oncology Nurse will assist Dosimetrist with instrument preparation for surgical case by sending to CSR Department all instruments needed for implant. In most cases, all instruments need to be sent to Central Supply 24 to 48 hours prior to each case and sent with the form "Radiation Oncology Instrument List."

2. Seed Implant Procedure:

   a. Mick Applicator

      i. During the surgical procedure, the Medical Dosimetrist is present to assist the Physicist and the Authorized User
as the dosimetry map reader.

ii. The medical dosimetrist uses "Prostate Seed Loading Pattern" for documenting total seeds used and the seed activity at the end of the case.

iii. Template coordinates for placing needles are read top line to bottom line and read left to right.

vi. Call out alphabet letter, followed by numerical number. (Example: Baker Four and Charlie Six, etc.)

v. Base number is given by physician at beginning of map reading (note: this can change during procedure). Base is 0.0 in the "retraction cm" column.

vi. One click is equivalent to 0.5 from base. (Example: One click is 0.5; Two clicks is 1.0; Three clicks is 1.5.)

vii. Base beneath cradle has a line that coordinates with the 5mm increments on cradle.

Example: Reader calls out to Radiation Oncologist, Charlie, three, four seeds, one click back. Oncologist then pulls loaded needle from seed box and hands loaded needle, keeping in horizontal position, to Urologist. Reader repeats, Charlie, three, four seeds, one click back. Urologist then inserts needle through template into perineum. The two physicians then agree on proper needle placement. Oncologist then unloads seeds into the prostate.

viii. The Urologist will perform a cystoscopy to look for and retrieve any loose seeds that may be in the bladder.

b. Pre-loaded Needles will arrive the day prior to the implant date. Upon arrival, physics and the Authorized User will verify and correct source
type, activity and loading pattern by review of supplied needle radiograph.

i. Ordered needles will be verified via autoradiograph by the physicist and the Authorized User.

ii. During the procedure, the Authorized User will identify and request the appropriate needle from the physics staff.

iii. The physics staff will verify and hand the requested needle to the Authorized User.

iv. The Authorized User will place the needle in the patient.

v. The physics staff and the Authorized User will verify proper needle placement.

E. Post-Operative

1. The Radiation Safety Officer/Physicist will monitor all implant activities in the Operating Room and survey with a Geiger counter all patient and procedure related items before they are disposed of or removed from the suite, such as: bedding, catheters, and urine.

2. The Radiation Safety Officer/Physicist will use a Geiger counter to measure and document on the Prostate Implants: Q.A. form the amount of radiation emitting from patient. Measurements should not exceed the following, as per NUREG 1556, Vol. 9, Rev. 2. Appendix U, Table U.1.

   I-125 at 1 Meter = 1mrem/hr
   Pd-103 at 1 Meter = 3mrem/hr
3. Operating Room Radioactive Seed Survey Process

  a. The room survey will be performed with a calibrated thin window Geiger Counter with the appropriate wall density and sensitivity.

  b. During the seed implant procedure the following areas will be monitored for dislodged seeds by request of the Authorized User or OR staff. The areas include the OR floor, loading table, clean surgical table, dirty surgical table, Mick loading box. Items to be surveyed during the procedure are the following: applicators, used needles, used or bloody gauze, urine, suction bottle, patient towels or drapes, used OR instruments.

  c. After the implant is complete the cystoscopy is performed. As this procedure is performed the urine and flushing liquid will be monitored for radioactive seeds. The cystoscope instruments will be checked as they are used and passed to the dirty OR table.

  d. If seeds are recovered in steps two and three they are to be inventoried and stored in the lead container brought to the OR for the specific patient.

  e. A C-arm film is taken in the OR to verify the seed count. If the film count agrees with the seed inventory as tracked by the dosimetrist. The patient can be released to the recovery room.

  f. Before the patient exits the OR room the patient is surveyed for radiation levels. The contact dose with the anterior pelvis is documented and the dose at one meter is documented. The one meter value is usually the anterior reading; however the patient is surveyed using a 180 degree around the pelvis.

  g. The bottom of the OR staff’s shoes will be evaluated for a stuck seed before exiting the OR.

  h. Once the patient leaves the OR the entire OR is resurveyed with lower
background. The trash is surveyed, gauze, urine, suction material, OR drapes, OR table, OR floor, surgical instruments (clean and dirty), staff gowns.

i. No radiation levels above background will be accepted in the post implant survey.

j. If contamination is found with no seed present, seed rupture must be evaluated as possibility. Appropriate wipe tests and analysis will be performed.

k. All extra and recovered radioactive seeds will be returned to the Radiation Oncology Hot Lab and inventoried.

4. When patient is released or transferred from PACU, all urine, catheters, and bedding associated with the patient must be cleared by the Radiation Safety Officer/Physicist before disposal.

5. A radiation sticker will be placed on the front of the patient’s chart and on the door of the patient’s room for the remainder of the patient’s stay. Recommendations for persons near a patient with radioactive implants will be clearly explained to patient and family.

6. Once discharge is ordered by the admitting physician and the patient leaves the facility, all garbage, linen, bedding, and furniture must be surveyed by the Radiation Safety Officer/Physicist with Geiger counter and found to be free of radiation before the room can be released for housekeeping.

7. Before the patient is released, a discharge instruction information sheet will be provided by the nurse, under the direction of the admitting physician.
F. Post implant CT scan

1. The patient will be scheduled for a 25 slice CT scan of the prostate approximately 30 days after the implant.

2. The physics staff will import the CT images into the treatment planning computer, input the activity and source type and identify all sources on the CT.

3. The Authorized User will identify and outline all relevant structures on CT (prostate, rectum, bladder, etc). The post plan, source locations, and DVH will be generated and printed by the physics staff for review and approved by the physician.

4. The Authorized User will review parameters outlined below to determine implant quality. The Authorized User will use a variety of implant quality metrics to determine if the implant meets at least two or a greater combination of the following factors. An overall grade of Satisfactory or Unsatisfactory will then be assigned.

   If an implant is Satisfactory, normal follow-up protocols for both the radiation oncologist and urologist will begin. If the implant is assessed as Unsatisfactory, the Authorized User will determine if a Medical Event needs to be reported to the NRC. The implant may be determined to be Unsatisfactory but does not meet criteria for a Medical Event. For both types of Unsatisfactory assessments, the Authorized User and the physics/planning team will decide if an external beam (IMRT) boost is required.

a. Dose Criteria by Isotope

<table>
<thead>
<tr>
<th>Isotope</th>
<th>Low Risk</th>
<th>Intermediate/High Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>I-125</td>
<td>D90&gt;135Gy</td>
<td>D90&gt;189Gy</td>
</tr>
<tr>
<td>Pd-103</td>
<td>D90&gt;123Gy</td>
<td>D90&gt;167Gy</td>
</tr>
</tbody>
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b. I-125 Dose/Volume Criteria

<table>
<thead>
<tr>
<th></th>
<th>Prostate</th>
<th>Rectum</th>
<th>Urethra</th>
</tr>
</thead>
<tbody>
<tr>
<td>V100</td>
<td>&gt;80%</td>
<td></td>
<td>&lt;1.3cc</td>
</tr>
<tr>
<td>D90 (Pd-103)</td>
<td>&gt;130Gy (&gt;150Gy)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>V150</td>
<td>30-50%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>V200</td>
<td>10-20%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dmax (Pd-103)</td>
<td>&lt;250Gy (&lt;222Gy)</td>
<td>&lt;200Gy (178Gy)</td>
<td>&lt;174Gy*(155Gy)</td>
</tr>
</tbody>
</table>

*Prostatic Urethra: 120-150% MPD (Minimum Prescribed Dose)

Membranous Urethra and Penile Bulb: D50<40% Minimum Peripheral Dose

5. A second, independent, radiation oncologist will also review the post plan. Both radiation oncologists must agree on the quality of the implant.

6. The post plan must be finalized within 30 days of post implant CT.

7. The senior physicist and the Authorized User will sign off on the post plan.

8. If it is determined by the Authorized User that a medical event (as defined by the USNRC) has taken place, the Radiation Safety Officer will be notified immediately and the medical event will be filed in accordance with the USNRC reporting process within 24 hours of discovery. The medical event will also be presented to the Radiation Safety Committee for internal review and evaluation.

9. One or more of the following will represent a medical event:
   a. The dose parameter selected differs from the prescription dose by greater than 20 percent.
   b. The wrong radioactive drug was administered.
   c. The dose was administered to the wrong patient.
| REFERENCES: |
| CROSS REFERENCES: |

d. The patient receives a dose to a part of the body other than the intended treatment site that exceeds by 50 percent or more the dose expected by proper administration of the prescription.

e. The difference between the dose administered and the prescribed dose exceeds one of the reporting limits contained in the NRC’s regulations at 10 CFR 35.3045, which correspond to the annual occupational dose limits at 10 CFR 20.1201.