Description:
Radiation oncology consists of two primary treatment modalities: external beam radiation therapy (EBRT) and brachytherapy. Brachytherapy is a type of radiation therapy that utilizes natural or manufactured radioactive isotopes or radionuclides that are temporarily or permanently implanted to treat malignancies or certain benign conditions and derives a physical advantage based upon the inverse square law of physics. This is achieved by implanting a radioactive source in the form of wires or seeds, close to or into the tumor or treatment site. There are currently three basic clinical brachytherapy formats: interstitial, intracavitary or intraluminal therapy. Brachytherapy may use a solid radioactive source, such as a 'seed' or liquid colloid isotopes, and may be either temporary or permanent. Further, brachytherapy may be called high dose rate or low dose rate.

Brachytherapy may be used independently as the sole treatment or as an adjunctive treatment in combination with external beam therapy and other modalities such as surgery or chemotherapy.

Brachytherapy may be performed concomitantly with surgical resection or in conjunction with procedures such as endoscopy or angioplasty, which are required to achieve access to the site of the disease. There are two distinct phases required to complete the process known as brachytherapy:
1. the insertion or placement of non-radioactive applicators or conduits that receive or transmit the radioactive material into the body, and
2. the loading of the radioactive material (the active or therapeutic agent) into the conduits or directly into tissue.

Low-dose rate (LDR) Brachytherapy - Rate of dose delivery is low (10-100 cGy per HOUR). LDR is usually delivered over several days in a hospital setting; however, LDR may consist of permanently implanted sources and be performed as either an ambulatory or in-patient procedure. Radiation therapy is delivered as the isotope decays.

Low-dose-rate brachytherapy is of two types:
1. Permanently inserted sources or temporarily inserted sources. Common permanent sources are Palladium 103, Iodine 125, Cesium 131 and Gold198 that are usually used for treatment of prostate cancer.
2. Common temporarily inserted seeds/sources are Iridium 192 and Cesium 137. Iridium is
physically smaller and can be used for interstitial implants (breast, head and neck, complex gynecological, sarcomas and others). The Cesium is contained in a larger tube and is used mostly for intracavitary gynecological implants. Temporary (LDR) implants usually are in place 1 to 3 days and patients are admitted and must be kept under radiation safety conditions in isolation on the wards to protect medical personnel from low level exposure to radiation.

Description of a Prostate Brachytherapy Low-Dose-Rate Procedure

Patients with prostate cancers that are eligible for seed implantation fall within a set of guidelines established by the treating radiation oncologist and urologist. These guidelines determine candidates for the procedure versus those patients who may be best suited for an alternative therapy. The physicians present the recommendations to the patient.

Prior to the permanent seed implant, a transrectal ultrasound, CT scan or MRI examination is done to determine the shape and size of the prostate and technical feasibility of prostate brachytherapy.

After the urology diagnostic work-up and low dose rate brachytherapy has been chosen by the patient, there are several aspects to the episode of care including preplan, implant, and post implant (post plan). The prostate is "mapped" to determine the number of seeds required. Some centers may perform a pre-plan calculation to determine which holes in the template the needles need to be inserted and how many seeds to deposit through each needle in order to adequately irradiate the prostate. Other centers are performing the planning in the operating room at the time of the implant. Preplan tumor mapping and simulations done prior to the implant should not be billed again at the time of the implant. Conversely, simulations done on the day of implant (real time) should not be billed a second time on a day prior to the implant. The implant is generally done on an outpatient basis without an overnight hospital stay at an outpatient hospital facility or an ASC. A radiation oncologist and urologist may be both present for the case, and work as a team along with other specialized staff or the radiation oncologist or surgeon may perform the procedure alone.

In the operating room, the patient is placed under anesthesia, general, spinal or local. The ultrasound probe is attached to the "stepper" assembly that also holds the square grid template against the perineum. The physician pushes stainless steel needles through the holes in the template, into the perineum and then the prostate, guided by the images seen on the ultrasound.

The physician may be performing a real-time plan with computers assessing the prostate gland and needle placement, or they may be following the pre-plan blueprint. Throughout the procedure there is an assessment of the implant and the prostate. This is done to assure an adequate placement is taking place to deliver sufficient radiation dose. This is done in 3D fashion with available technology.

The number of seeds used depends on the volume of the prostate.
Fifty to 150 seeds are inserted using 15-40 needles (Most prostate implants require 60 to 120 seeds). This varies with the size and shape of the prostate and other factors (e.g. seed activity). There are three types of radioactive material (radioisotopes) that can be implanted into the prostate: iodine (I-125); palladium (Pd-103); and cesium (Cs-131).

Post implant, a second dataset is done to produce an accurate and safe plan (post plan). The documentation should support the simulation done. This can be done on the day of the procedure or up to 4 weeks following the procedure. This allows for review of the plan and true delivery compared with the dose planned.

**High-dose rate (HDR) brachytherapy** - Treatment delivery is at higher dose rates (10-100 cGy per MINUTE).

HDR is performed by using a remote afterloading device to deliver the radioactive source(s). HDR allows the dose to be delivered customarily in minutes and usually on an outpatient basis and is often given in a series of multiple fractions.

High-dose-rate brachytherapy involves the use of a high activity radiation source with source radioactivity and energy far too great to allow manual handling. HDR may be used for virtually any site in the body that is suitable for brachytherapy.

**Description of a High-Dose-Rate Procedure.**
The HDR brachytherapy system uses a single, tiny (1mm by 3 mm) source that contains a highly radioactive source of Iridium-192 that is laser welded to the end of a thin, flexible stainless steel cable. The HDR machine, called a remote afterloader, safely stores the radiation source between treatments and delivers the source directly into the patient during therapy. The first step in the HDR brachytherapy process is the placement of the brachytherapy catheters, needles or other treatment applicators into the patient.

Then, following localization radiographs or scans (simulation) and related computer based treatment planning calculations (treatment planning/dosimetry), HDR treatment is administered to the patient in a shielded vault. The computer-guided remote afterloader is used to direct the source with millimeter precision into the applicator system. The source moves in 5mm steps to specific locations within the hollow conduits implanted in the target volume. It stops at designated positions called "dwell" positions. The distribution of radiation dose is determined by the dwell position location and how long the source remains at each of the many potential sites. HDR brachytherapy treatment courses may vary from 1 to 12 or more treatments (also known as fractions), depending on the type of cancer being treated, the prescribed dose, whether external radiation is also being administered and many other factors.

**Pulsed Dose Rate (PDR) Brachytherapy:** Uses sources of intermediate strength and delivers a series of doses on a 1-2 hourly schedule over a 1-2 day treatment period. It is also a form of remote afterloading.
Indications

Brachytherapy may be indicated as a primary or adjunctive therapy in a variety of tumors. A dose rate is selected based on the individual needs of the patient. LDR (low dose rate) and HDR (high dose rate) brachytherapy are two delivery systems for brachytherapy that use radioactive material to deliver a dose of intensive radiation therapy to a specific well-defined local site (treatment volume). In both LDR and HDR the treatment site should be defined and accessible to the applicators that are the delivery medium for the radioactive sources. Brachytherapy is done to treat a primary or metastatic neoplasm, while sparing sensitive, normal tissues that may be nearby. LDR and HDR procedures may be given with intent to cure, intent to palliate, or to obtain local control (either cure or palliation). Both may be given in conjunction with a course of external beam radiation therapy, or as single modalities.

The typical requirements of brachytherapy may involve:

1. Treatment planning (77263)

   Brachytherapy is routinely designated complex (CPT code 77263) because it requires complex treatment volume design, dose levels near normal tissue tolerance, analysis or special tests, complex fractionation, or delivery concurrent with other therapeutic modalities or treatment of previously irradiated tissues.

2. Dosimetry (77300)

   Brachytherapy requires certain calculations to be made throughout the course of treatment. Each basic dosimetry calculation may be submitted when performed for brachytherapy treatment.

3. Radiation treatment management (77427 - three or more treatments a week) or (77431 - one treatment a week) Special treatment procedure (77470)

   Brachytherapy management requires an understanding of the process of treatment delivery. There is a completely different process for patient management. Treatment is done weekly, 2 or more times a week and occasionally twice per day.

   The management of brachytherapy includes overall management of the patient during the course of radiation therapy. It includes review of the treatment record to assure that the therapy is proceeding according to the radiation plan and dose prescription, medical evaluation of the patient during the course of treatment, making the necessary adjustments to the applicator during the course of treatment, and any other modifications or clinical interventions needed to assure safe and effective treatment during the clinical course of therapy.

   Special treatment procedure (77470):

   The delivery of brachytherapy often requires special arrangements with the operating room and radiation safe ward, coordination of the applicator insertion process with other specialists, preparation and provision of the applicators and related equipment, scheduling and integration of required physics support, and acquisition and preparation of the radiation sources. Brachytherapy is often delivered in conjunction with external radiation, chemotherapy, or
surgery. Integration of these processes makes brachytherapy a special treatment procedure.

The regulation reads:
Weekly Radiation Therapy Management (CPT 77427). Pay for a physician's weekly treatment management services under code 77427. Instruct billing entities to indicate on each claim the number of fractions for which payment is sought.

A weekly unit of treatment management is equal to five fractions or treatment sessions. A week for the purpose of making payments under these codes is comprised of five fractions regardless of the actual time period in which the services are furnished. It is not necessary that the radiation therapist personally examine the patient during each fraction for the weekly treatment management code to be payable.

Multiple fractions representing two or more treatment sessions furnished on the same day may be counted as long as there has been a distinct break in therapy sessions, and the fractions are of the character usually furnished on different days.

Code 77427 is also reported if there are three or four fractions beyond a multiple of five at the end of a course of treatment; one or two fractions beyond a multiple of five at the end of a course of treatment are not reported separately. The professional services furnished during treatment management typically consist of:

- review of port films;
- review of dosimetry, dose delivery, and treatment parameters;
- review of patient treatment set-ups;
- examination of patient for medical evaluation and management, (e.g., assessment of the patient’s response to treatment, coordination of care and treatment, review of imaging and/or lab test results).

EXAMPLE:
18 fractions = 4 weekly services
62 fractions = 12 weekly services
8 fractions = 2 weekly services
6 fractions = 1 weekly service

If billings have occurred which indicate that the treatment course has ended (and, therefore, the number of residual fractions has been determined), but treatments resume, adjust your payments for the additional services consistent with the above policy.

EXAMPLE:
8 fractions = payment for 2 weeks
2 additional fractions are furnished by the same physician. No additional Medicare payment is made for the 2 additional fractions.
Please note that the management code should be used mainly if there will be more than one fraction of HDR or LDR

4. Simulation (77280-77295)
For brachytherapy, simulation may require the use of imaging examinations of the implanted sources or applicator(s) containing dummy sources. These films of the implanted sources are used to develop isodose curves and other dosimetry, and may be billed separately, when appropriate.

Brachytherapy simulation CPT code 77290 is the complex process of obtaining images of the implanted region for purposes of making position adjustments and for performing dose calculations. Non-radioactive "dummy" sources are used to geographically define the "eventual position" of the radioactive sources in temporary implant devices, whereas permanently implanted sources are imaged directly. Contrast may be utilized to delineate adjacent normal tissues and organs.

Subsequent "check" verification simulations during the course of temporary implants to confirm or correct applicator position are reported as simple CPT code 77280.

CPT code 77295 may be billed as part of the brachytherapy process when the needed parameters are included (i.e. 3D volume reconstruction with DVH for target and normal tissues, etc. This information can be obtained from CT, U/S or MRI.).

5. Isodose planning (77326-77328)
Brachytherapy requires an isodose plan. This plan determines the dose at each implanted source and throughout the treatment volume and doses to surrounding normal tissue.

6. Handling and Loading of Radioelement (77790)
Where brachytherapy techniques require the manual loading of an isotope (LDR), the supervision, loading and handling of the isotope may be separately reported.

7. Source Application/Placement (77761-77763, 77776-77778, and 77789)
Selection and placement of after-loading applicators and the loading and unloading of radioactive sources may be performed by the radiation oncologist alone or in collaboration with another physician.

8. Applicator placement.
The choice of applicators and the actual placement of the after-loading device may be performed by the radiation oncologist alone or in collaboration with another physician (e.g., gynecologist, urologist, pulmonologist, gastroenterologist, thoracic surgeon).

9. Treatment devices (77332-77334)
Treatment devices (e.g., blocks, shields and wedges) may include the use of certain templates, molds, or other apparatus that may be required for specific clinical circumstances. These may
be covered as treatment devices.

10. Medical Physics Services (77336, 77370 and 77331)
CPT code 77336 is a "weekly code;" however, for radiation therapy treatment that is not administered in five weekly fractions (such as brachytherapy) or for a course of radiation therapy consisting of one or two fractions, code 77336 may be reported.

CPT code 77370 may be justified for the complex interrelationships of electron and photon ports and complex dosimetric considerations in brachytherapy, including high dose rate remote afterloader applications, intravascular brachytherapy treatments, and interstitial radioactive seed implantation.

CPT code 77331 is Special dosimetry (e.g. TLD, microdosimetry) when prescribed by a physician. In some instances, measurement of the delivered radiation dose may be used to guide and determine the dose to selected positions within or around the implant treatment volume. (This can be very helpful, especially in difficult case such as retreatment using brachytherapy in previously irradiated areas.)

11. For coverage of intravascular brachytherapy see policy CV-035
12. For coverage of External Beam radiation see policy RAD-014.

Limitations

1. Although radiographs may be used in brachytherapy simulation, these images should not be reported as port-films.
2. Follow-up visits for 90 days after treatment are not separately payable. (This does not apply to a patient visit for complaints unrelated to the current treatment).
3. Only a physician authorized as an authorized user by the Nuclear Regulatory Commission or an Agreement State for brachytherapy should work with radioactive materials.
4. Products used for the patient's comfort may not be charged as treatment devices (e.g., pillows, pads, or cushions).
**CPT/HCPCS Codes**

**Group 1 Paragraph:** Many of the CPT codes in the radiation oncology section can be used for both external beam radiation therapy (EBRT) and brachytherapy, while others are specific to one modality or the other. See policy RAD014 for more information on these services.

The CPT codes below, with the exception of, 77280-77295, 77336, 77370 are those specific only to brachytherapy. CPT codes 77300 (Basic Dosimetry), 77332-77334 (Treatment devices, designs and construction), 77336 (Continuing medical physics consultation, including assessment of treatment parameters, quality assurance of dose delivery, and review of patient treatment documentation in support of the radiation oncologist, reported per week of therapy), 77370 (Special medical radiation physics consultation), and 77470 (Special treatment procedure) are also relevant to brachytherapy.

**Group 1 Codes:**

- 77261 Radiation therapy planning
- 77262 Radiation therapy planning
- 77263 Radiation therapy planning
- 77280 Set radiation therapy field
- 77285 Set radiation therapy field
- 77290 Set radiation therapy field
- 77295 Set radiation therapy field
- 77326 Brachytx isodose calc simp
- 77327 Brachytx isodose calc interm
- 77328 Brachytx isodose plan compl
- 77331 Special radiation dosimetry
- 77336 Radiation physics consult
- 77370 Radiation physics consult
- 77470 Special radiation treatment
- 77750 Infuse radioactive materials
- 77761 Apply intrcav radiat simple
- 77762 Apply intrcav radiat interm
- 77763 Apply intrcav radiat compl
- 77776 Apply interstit radiat simpl
- 77777 Apply interstit radiat inter
77778 Apply interstit radiat compl
77785 Hdr brachytx 1 channel
77786 Hdr brachytx 2-12 channel
77787 Hdr brachytx over 12 chan
77789 Apply surface radiation
77790 Radiation handling
Q3001 Brachytherapy Radioelements

**Group 2 Paragraph: Brachytherapy Sources Payable as of 01/01/2008 in the ASC setting**

**Group 2 Codes:**

- A9527 Iodine I-125 sodium iodide
- C1716 Brachytx, non-str, Gold-198
- C1717 Brachytx, non-str,HDR Ir-192
- C1719 Brachytx, NS, Non-HDRIr-192
- C2616 Brachytx, non-str,Yttrium-90
- C2634 Brachytx, non-str, HA, I-125
- C2635 Brachytx, non-str, HA, P-103
- C2636 Brachy linear, non-str,P-103
- C2638 Brachytx, stranded, I-125
- C2639 Brachytx, non-stranded,I-125
- C2640 Brachytx, stranded, P-103
- C2641 Brachytx, non-stranded,P-103
- C2642 Brachytx, stranded, C-131
- C2643 Brachytx, non-stranded,C-131
- C2698 Brachytx, stranded, NOS
- C2699 Brachytx, non-stranded, NOS
- C9728 Place device/marker, non pro

**Group 3 Paragraph: The following CPT procedure codes may be included for performing prostate brachytherapy:**

**Group 3 Codes:**
55860 Surgical exposure prostate
55875 Transperi needle place pros
55876 Place rt device/marker pros
76000 Fluoroscope examination
76001 Fluoroscope exam extensive
76872 Us transrectal
76873 Echograp trans r pros study
76950 Echo guidance radiotherapy
76965 Echo guidance radiotherapy
77012 Ct scan for needle biopsy
C9725 Place endorectal app

**Group 4 Paragraph:** The following CPT procedure codes may be included for performing prostate brachytherapy with a TC modifier:

**Group 4 Codes:**

77014 Ct scan for therapy guide

**Group 5 Paragraph:** The following CPT procedure code may be included for lung brachytherapy:

**Group 5 Codes:**

31626 Bronchoscopy w/markers
31643 Diag bronchoscope/catheter
32553 Ins mark thor for rt perq

**Group 6 Paragraph:** The following CPT procedure code may be included for esophageal brachytherapy:

**Group 6 Codes:**

43241 Upper GI endoscopy with tube

**Group 7 Paragraph:** The following CPT procedure codes may be included for gynecologic cases:
Group 7 Codes:

49327 Lap ins device for rt
49411 Ins mark abd/pel for rt perq
49412 Ins device for rt guide open
55920 Place needles pelvic for rt
57155 Insert uteri tandem/ovoids
57156 Ins vag brachytx device
58346 Insert heyman uteri capsule

Group 8 Paragraph: The following CPT procedure codes may be included for breast cases:

Group 8 Codes:

19296 Place po breast cath for rad
19297 Place breast cath for rad
19298 Place breast rad tube/caths
C9726 Rxt breast appl place/remov

ICD-9 Codes that Support Medical Necessity

Group 1 Paragraph: Note: ICD-9 codes must be coded to the highest level of specificity.

Group 1 Codes:

140.0 - MALIGNANT NEOPLASM OF UPPER LIP VERMILION BORDER - MALIGNANT
195.8 - NEOPLASM OF OTHER SPECIFIED SITES
196.0 - SECONDARY AND UNSPECIFIED MALIGNANT NEOPLASM OF LYMPH NODES OF HEAD
198.89 - FACE AND NECK - SECONDARY MALIGNANT NEOPLASM OF OTHER SPECIFIED SITES
199.0 - DISSEMINATED MALIGNANT NEOPLASM - OTHER MALIGNANT NEOPLASM OF
199.1 - UNSPECIFIED SITE
200.00 - RETICULOSARcoma UNSPECIFIED SITE - UNSPECIFIED LEUKEMIA IN REMISSION
208.91 - RETICULOSARCOMA UNSPECIFIED SITE - UNSPECIFIED LEUKEMIA IN REMISSION
233.0 - CARCINOMA IN SITU OF BREAST
235.0 - NEOPLASM OF UNCERTAIN BEHAVIOR OF MAJOR SALIVARY GLANDS - NEOPLASM OF
238.9 - UNCERTAIN BEHAVIOR SITE UNSPECIFIED
372.40 - PTERYGIUM UNSPECIFIED - RECURRENT PTERYGIUM