

CLINICAL APPROPRIATENESS GUIDELINES

RADIATION ONCOLOGY

Appropriate Use Criteria: Brachytherapy, Intensity Modulated Radiation Therapy, Stereotactic Body Radiation Therapy, and Stereotactic Radiosurgery

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Description and Application of the Guidelines

The AIM Clinical Appropriateness Guidelines (hereinafter “the AIM Clinical Appropriateness Guidelines” or the “Guidelines”) are designed to assist providers in making the most appropriate treatment decision for a specific clinical condition for an individual. As used by AIM, the Guidelines establish objective and evidence-based criteria for medical necessity determinations where possible. In the process, multiple functions are accomplished:

- To establish criteria for when services are medically necessary
- To assist the practitioner as an educational tool
- To encourage standardization of medical practice patterns
- To curtail the performance of inappropriate and/or duplicate services
- To advocate for patient safety concerns
- To enhance the quality of health care
- To promote the most efficient and cost-effective use of services

The AIM guideline development process complies with applicable accreditation standards, including the requirement that the Guidelines be developed with involvement from appropriate providers with current clinical expertise relevant to the Guidelines under review and be based on the most up-to-date clinical principles and best practices. Relevant citations are included in the References section attached to each Guideline. AIM reviews all of its Guidelines at least annually.

AIM makes its Guidelines publicly available on its website twenty-four hours a day, seven days a week. Copies of the AIM Clinical Appropriateness Guidelines are also available upon oral or written request. Although the Guidelines are publicly-available, AIM considers the Guidelines to be important, proprietary information of AIM, which cannot be sold, assigned, leased, licensed, reproduced or distributed without the written consent of AIM.

AIM applies objective and evidence-based criteria, and takes individual circumstances and the local delivery system into account when determining the medical appropriateness of health care services. The AIM Guidelines are just guidelines for the provision of specialty health services. These criteria are designed to guide both providers and reviewers to the most appropriate services based on a patient's unique circumstances. In all cases, clinical judgment consistent with the standards of good medical practice should be used when applying the Guidelines. Guideline determinations are made based on the information provided at the time of the request. It is expected that medical necessity decisions may change as new information is provided or based on unique aspects of the patient's condition. The treating clinician has final authority and responsibility for treatment decisions regarding the care of the patient and for justifying and demonstrating the existence of medical necessity for the requested service. The Guidelines are not a substitute for the experience and judgment of a physician or other health care professionals. Any clinician seeking to apply or consult the Guidelines is expected to use independent medical judgment in the context of individual clinical circumstances to determine any patient's care or treatment.

The Guidelines do not address coverage, benefit or other plan specific issues. Applicable federal and state coverage mandates take precedence over these clinical guidelines. If requested by a health plan, AIM will review requests based on health plan medical policy/guidelines in lieu of the AIM Guidelines.

The Guidelines may also be used by the health plan or by AIM for purposes of provider education, or to review the medical necessity of services by any provider who has been notified of the need for medical necessity review, due to billing practices or claims that are not consistent with other providers in terms of frequency or some other manner.

General Clinical Guideline

Clinical Appropriateness Framework

Critical to any finding of clinical appropriateness under the guidelines for a specific diagnostic or therapeutic intervention are the following elements:

- Prior to any intervention, it is essential that the clinician confirm the diagnosis or establish its pretest likelihood based on a complete evaluation of the patient. This includes a history and physical examination and, where applicable, a review of relevant laboratory studies, diagnostic testing, and response to prior therapeutic intervention.
- The anticipated benefit of the recommended intervention should outweigh any potential harms that may result (net benefit).
- Current literature and/or standards of medical practice should support that the recommended intervention offers the greatest net benefit among competing alternatives.
- Based on the clinical evaluation, current literature, and standards of medical practice, there exists a reasonable likelihood that the intervention will change management and/or lead to an improved outcome for the patient.

If these elements are not established with respect to a given request, the determination of appropriateness will most likely require a peer-to-peer conversation to understand the individual and unique facts that would supersede the requirements set forth above. During the peer-to-peer conversation, factors such as patient acuity and setting of service may also be taken into account.

Simultaneous Ordering of Multiple Diagnostic or Therapeutic Interventions

Requests for multiple diagnostic or therapeutic interventions at the same time will often require a peer-to-peer conversation to understand the individual circumstances that support the medical necessity of performing all interventions simultaneously. This is based on the fact that appropriateness of additional intervention is often dependent on the outcome of the initial intervention.

Additionally, either of the following may apply:

- Current literature and/or standards of medical practice support that one of the requested diagnostic or therapeutic interventions is more appropriate in the clinical situation presented; or
- One of the diagnostic or therapeutic interventions requested is more likely to improve patient outcomes based on current literature and/or standards of medical practice.

Repeat Diagnostic Intervention

In general, repeated testing of the same anatomic location for the same indication should be limited to evaluation following an intervention, or when there is a change in clinical status such that additional testing is required to determine next steps in management. At times, it may be necessary to repeat a test using different techniques or protocols to clarify a finding or result of the original study.

Repeated testing for the same indication using the same or similar technology may be subject to additional review or require peer-to-peer conversation in the following scenarios:

- Repeated diagnostic testing at the same facility due to technical issues
- Repeated diagnostic testing requested at a different facility due to provider preference or quality concerns
- Repeated diagnostic testing of the same anatomic area based on persistent symptoms with no clinical change, treatment, or intervention since the previous study
- Repeated diagnostic testing of the same anatomic area by different providers for the same member over a short period of time

Repeat Therapeutic Intervention

In general, repeated therapeutic intervention in the same anatomic area is considered appropriate when the prior intervention proved effective or beneficial and the expected duration of relief has lapsed. A repeat intervention requested prior to the expected duration of relief is not appropriate unless it can be confirmed that the prior intervention was never administered.

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Guidelines for Radiation Oncology

Definitions

Statistical terminology

- **Confidence interval (CI)** describes the amount of uncertainty associated with a sampling method. Confidence intervals are usually reported to help explain how reliable, or precise, a result is.
- **Hazard ratio (HR)** is a measure of how often a particular event happens in one group compared to how often it happens in another group, over time. In cancer research, hazard ratios are often used in clinical trials to measure survival at any point in time in a group of patients who have been given a specific treatment compared to a control group given another treatment or a placebo. A hazard ratio of one means that there is no difference in survival between the two groups. A hazard ratio of greater than one or less than one means that survival was better in one of the groups.
- **Odds ratio (OR)** is a measure of the odds of an event happening in one group compared to the odds of the same event happening in another group. In cancer research, odds ratios are most often used in case-control (backward looking) studies to find out if being exposed to a certain substance or other factor increases the risk of cancer. For example, researchers may study a group of individuals with cancer (cases) and another group without cancer (controls) to see how many people in each group were exposed to a certain substance or factor. They calculate the odds of exposure in both groups and then compare the odds. An odds ratio of one means that both groups had the same odds of exposure and, therefore, the exposure probably does not increase the risk of cancer. An odds ratio of greater than one means that the exposure may increase the risk of cancer, and an odds ratio of less than one means that the exposure may reduce the risk of cancer. Also called relative odds.
- **Overall survival (OS)** is the length of time from either the date of diagnosis or the start of treatment for a disease, such as cancer, that patients diagnosed with the disease are still alive. In a clinical trial, measuring the overall survival is one way to see how well a new treatment works.
- **Overall survival rate** is the percentage of people in a study or treatment group who are still alive for a certain period of time after they were diagnosed with or started treatment for a disease, such as cancer. The overall survival rate is often stated as a five-year survival rate, which is the percentage of people in a study or treatment group who are alive five years after their diagnosis or the start of treatment. Also called survival rate.
- **Progression-free survival (PFS)** is the length of time during and after the treatment of a disease, such as cancer, that a patient lives with the disease but it does not get worse. In a clinical trial, measuring the progression-free survival is one way to see how well a new treatment works.
- **Relative risk (RR)** is a measure of the risk of a certain event happening in one group compared to the risk of the same event happening in another group. In cancer research, relative risk is used in prospective (forward looking) studies, such as cohort studies and clinical trials. A relative risk of one means there is no difference between two groups in terms of their risk of cancer, based on whether or not they were exposed to a certain substance or factor, or how they responded to two treatments being compared. A relative risk of greater than one or of less than one usually means that being exposed to a certain substance or factor either increases (relative risk greater than one) or decreases (relative risk less than one) the risk of cancer, or that the treatments being compared do not have the same effects. Also called risk ratio.
- **Response rate** is the percentage of patients whose cancer shrinks or disappears after treatment.

References

1. National Cancer Institute (NCI). NCI dictionary of cancer terms [Internet] [cited 2020 May 26]. Available from: <https://www.cancer.gov/publications/dictionaries/cancer-terms>.
2. National Institutes of Health (NIH). U.S. National Library of Medicine (NLM). Course: finding and using health statistics: glossary [Internet] [cited 2020 May 26]. Available from: <https://www.nlm.nih.gov/nichsr/usestats/glossary.html>.

Image Guidance in Radiation Oncology

General Information

Modalities used in Image Guidance

- Ultrasound-based guidance
- Stereoscopic x-ray guidance
- CT based image guidance
- Real-time intrafraction guidance

Radiation Oncology Considerations

Image guidance, also known as image-guided radiation therapy (IGRT), refers to pretreatment imaging used to verify correct patient positioning in cases where sub-centimeter accuracy is needed. There are multiple different technologies which can be utilized for IGRT including ultrasound visualization, stereoscopic x-ray guidance, computed tomography based guidance and continuous intra-fraction position monitoring. Both the American Society for Radiation Oncology (ASTRO) and the American College of Radiology (ACR) have published descriptive overviews and guidance related to the available methods, performance, quality assurance, limitations and safety aspects of image-guided therapy.

IGRT is an integral part of the delivery of highly conformal treatments such as intensity modulated radiation therapy (IMRT), stereotactic body radiation therapy (SBRT) and stereotactic radiosurgery (SRS). Recognition of this fact has resulted in changes to the current procedural terminology (CPT) definitions such that the technical aspect of IGRT is now bundled with IMRT delivery. Similarly, image guidance procedures have always been bundled for SBRT and SRS.

When highly tailored dose distributions such as IMRT and stereotactic radiation therapy are not being utilized, sub-centimeter precision is not generally needed and accurate patient setup is achieved with other techniques. These include patient immobilization with custom treatment devices like body molds or thermoplastic masks, placement of tattoos aligned to a 3-dimensional laser array in the treatment room and offline review of port verification films. Small daily setup uncertainties exist and these are taken into account in the target expansion process where an additional margin is added to the gross tumor volume (GTV) to create the clinical target volume (CTV) and ultimately the planning target volume (PTV) during the treatment planning process.

Pretreatment image acquisition and isocenter shifting has been suggested as a strategy to allow a safe reduction in PTV margins. By decreasing the volume of normal tissue exposed to radiation, the use of IGRT with 3D conformal radiation or IMRT has been suggested as a way to reduce toxicity, allow an increase in the radiation dose, or both. This has been most extensively studied in prostate cancer, where evidence of a dose response and improved freedom from failure with dose escalation from 70 Gy to 78 Gy was demonstrated in a randomized trial of intermediate to high-risk patients treated with radiotherapy. The higher dose treatment was associated with increased rectal toxicity and this was correlated with the proportion of the rectal volume receiving > 70 Gy. This prompted efforts to dose escalate beyond 78 Gy and simultaneously decrease normal tissue toxicity by using IGRT, IMRT, and ultimately image-guided IMRT.

When used with 3D conformal radiation, IGRT has been shown to reduce late toxicities after prostate cancer radiotherapy. A study by Gill showed that patients treated with IGRT had significantly lower rates of > grade 3 urinary frequency (7% vs 23%), > grade 2 diarrhea (3% vs 15%) and fatigue (8% vs 23%) compared to patients treated without IGRT despite higher dose treatment in the IGRT patients. Another report by Singh demonstrated that treatment with IGRT significantly decreased reports of post-treatment rectal pain (OR 0.07), urgency (OR 0.27), diarrhea (OR 0.009) and change in bowel habits (OR 0.18) compared to patients treated without IGRT. There was no difference in genitourinary symptoms reported in that study.

Multiple reports have also shown reduced late toxicities after high dose IMRT for prostate cancer compared to 3D conformal radiotherapy. Zelefsky reported 10-year follow-up comparing toxicity for prostate patients treated with IMRT vs 3D conformal radiotherapy and found that > grade 2 gastrointestinal complaints were significantly

lower in the IMRT group (5% vs 13%). One criticism of these studies is that they were performed in the pre-IGRT era and it is unclear whether IGRT and IMRT both independently reduce toxicity. Comparing 3D and IMRT for patients who were all treated with implanted fiducial based image-guidance, IMRT resulted in significantly lower rectal doses and subsequent late rectal toxicity. Finally, the use of image-guided IMRT (IG-IMRT) with implanted fiducial markers has been shown to improve 3-year biochemical control and decrease late urinary toxicity in high-risk prostate patients compared to patients treated to the same dose (86.4 Gy) with IMRT but without IGRT.

Daily IGRT has been compared to weekly IGRT for definitive treatment of prostate cancer. Patients treated with daily image guidance experienced decreased treatment-related toxicity and improved biochemical disease-free survival compared to weekly IGRT.

Studies of post-prostatectomy IMRT have demonstrated superior dose distribution to the target volume with the use of IMRT, as compared with 3D conformal radiation delivery, with better sparing of nearby critical healthy tissue structures and less severe toxicity-related morbidity. The use of pretreatment cone beam CT image-guidance to a median dose of 68.4 Gy has been compared to post-operative radiotherapy using weekly port films to a dose of 64.8 Gy. Despite treatment to a higher dose, the IGRT group was noted to have similar genitourinary and gastrointestinal toxicities. Pretreatment corrective left-right, anteroposterior, and superoinferior shifts were required in 15%, 6%, and 19% of cases, respectively, supporting the use of pretreatment imaging.

The ACR-ASTRO practice parameter for IGRT indicates that “when the target is not clearly visible and bony anatomy is not sufficient for adequate target alignment, fiducial markers may be needed.” For soft tissue targets such as the prostate, implanted fiducial markers have been validated as an accurate way to localize the target when using orthogonal imaging. Based on this research in prostate cancer, use of implanted fiducial markers for other soft tissue targets located in close proximity to critical structures is appropriate when needed to safely reduce PTV margins and reduce the risk of late complications.

In the setting of head and neck cancer, IGRT has been shown to allow a safe reduction of margin expansion and the ability to detect significant anatomic changes which might benefit from re-planning. Chen has reported a series of 225 consecutively treated head and neck cancer patients treated with image-guided IMRT. IGRT was performed with either kilovoltage or megavoltage volumetric imaging prior to each treatment. The first 95 patients were treated with a 5 mm CTV to PTV expansion and the following 130 patients were treated with a 3 mm expansion. Two-year local control was equal for the two groups. Examination of the treatment failures did not reveal any marginal recurrences in either cohort. The authors concluded that when IGRT is used, the CTV to PTV margin can safely be reduced to 3 mm. A subsequent report included an additional 134 patients with 3 mm margin expansions (264 total) and found that the 3-year locoregional control was equal in the two groups. Compared to the 5 mm margin group, the 3 mm margin patients had a lower incidence of gastrostomy-tube dependence at 1 year (10% vs 3%; $P = .001$) and esophageal stricture (14% vs 7%; $P = .01$). IGRT can also help identify patients who would benefit from adaptive replanning to prevent overdose of critical structures such as the spinal cord if significant weight loss occurs during treatment. Essentially all of the research around IGRT for head and neck cancer has been performed in the setting of IMRT. There are no data supporting the use of IGRT for head and neck cancer patients treated with 3D conformal radiotherapy.

IGRT in the non-IMRT setting can be justified in cases where the use of surface tattoos and standard immobilization techniques are known to be inadequate. In obese patients with deep seated tumors of the abdomen and pelvis, surface landmarks are known to be inaccurate. In a study performed before the term image-guidance was coined, the authors report the need to shift an average of 11.4 mm in left-right axis and 7.2 mm in the superior-inferior axis in order to properly align obese patients receiving pelvic radiotherapy for prostate cancer based on pretreatment portal imaging. Wong has also reported that using computed tomography based IGRT, shifts of greater than 10 mm were needed 21.2% of the time to correctly position the prostate in moderately to severely obese patients ($BMI > 35$). This was significantly more than shifts needed in normal weight, overweight and mildly obese patients. ASTRO has used this scenario as an example of where IGRT may be required in conjunction with three-dimensional conformal radiotherapy in their Health Policy Coding Guidance document.

A recent study of the setup accuracy for lung cancer treatment showed that when compared to tattoos, using cone beam CT registration to the spine and carina improved target coverage approximately 50% of the time. Even using skin tattoos, however, the combined lung and nodal targets were found to be within the PTV over 97% of the time.

Tumor motion during the breathing cycle needs to be evaluated and managed when highly conformal radiation techniques are used to treat lung cancer. Liu evaluated respiratory related tumor motion in 152 patients with lung cancer and found that motion in the superoinferior (SI) axis was > 0.5 cm in 39% of patients and > 1 cm in 11% of patients. The degree of respiratory cycle related motion was more pronounced with smaller lesions and with tumors further from the lung apex. Four dimensional CT (4DCT) scan planning coupled with IMRT is associated with improved overall survival (HR 0.64) and a decreased risk of > grade 3 pneumonitis (HR 0.33) compared to 3D conformal radiotherapy. The volume of lung receiving 20 Gy (V20) was significantly lower in the 4DCT/IMRT group. The American Association of Physicists in Medicine (AAPM) Task Group 76 guidelines summarized the adequate methods to account for this respiratory motion including 4DCT, slow CT, inhale/exhale/breath-hold CT, respiratory gating with internal fiducial markers or external markers to signal respiration, breath hold, abdominal compression for shallow breathing and real time tracking. There are no studies supporting the use of IGRT for lung cancer in the 3D conformal setting.

With left sided breast cancers, there is concern about cardiac toxicity due to the proximity of the heart to the treatment field. Intensity modulated radiation therapy (IMRT) has been used to decrease the cardiac dose during left sided radiation treatment. Image-guided deep inspiration breath hold (DIBH) techniques have been demonstrated to reduce cardiac exposure to radiation. A feasibility of IGRT for cardiac sparing in patients with left-sided breast cancer was investigated in a prospective study authored by Borst. Nineteen patients with left-sided breast cancer were treated with the deep inspiration breath hold (DIBH) technique during IGRT. Use of DIBH in these patients reduced mean cardiac dose (1.7 Gy vs 5.1 Gy), the maximum dose (37 Gy vs 49 Gy) and the volume of heart receiving 30 Gy (0.3 cc vs 6.3 cc) compared with the free breathing technique. Similar results have been described in a larger series of 50 patients recently published by Cosma. Patients were eligible for inclusion in this study if an absolute volume of 10cc received more than 50% of the prescription dose (D10cc > 50%) based on criteria described by Wang. In these patients, the D10cc was reduced from 34.8 Gy for the free breathing group to 6.7 Gy for the DIBH group ($P < .001$).

For the majority of cases treated with 3D conformal radiotherapy, there is no evidence that the routine use of IGRT results in clinical benefit. Regarding clinical outcomes associated with IGRT, a recent review article concluded that “results of current and future clinical trials will hopefully demonstrate the net gain in therapeutic ratio from application of IGRT technologies and the onus lies on the radiation oncology community to take up the challenge of demonstrating the benefit of expensive IGRT approaches.”

Multiple publications have documented the additional radiation exposure which occurs in conjunction with IGRT. Patient doses range from 1-3 mGy for gantry mounted kV systems to between 10 and 50 mGy per image for cone beam and fan beam CT scans. As with any medical procedure, the risks of radiation exposure must be weighed against the benefits of daily imaging. In situations where there is a lack of demonstrable benefit, concern about potential harms of this technology are relevant. Even in clinical scenarios where IGRT is considered medically necessary, the technique chosen should expose the patient to the minimum amount of radiation needed to achieve adequate visualization.

The National Comprehensive Cancer Network (NCCN) recommends using IGRT when using stereotactic body radiation therapy (SBRT) and when 3D conformal radiation or IMRT is used with steep dose gradients around the target, organs at risk are in close proximity to target tissues and when utilizing gating or other motion management techniques.

For breast cancer, NCCN states that routine use of daily imaging is not recommended.

Society Recommendations

ASTRO/ACR – The American Society of Radiation Oncology (ASTRO) and The American College of Radiology (ACR) have published practice guidelines for image-guided radiation therapy (IGRT). The technologies for performing IGRT are described. The document also reviews suggested qualifications and responsibilities of the personnel involved in the performance of IGRT. The authors note that IGRT can be used to enhance either 3D conformal radiotherapy or intensity modulated radiation therapy (IMRT) but do not elaborate on clinical necessity for IGRT with either of these modalities. IGRT is noted to be a necessary and integral part of stereotactic body radiation therapy (SBRT). Elements of interfraction and intrafraction target motion are discussed. Fiducial marker placement and migration are reviewed. As part of the process of IGRT implementation, it is suggested that the radiation oncologist develop clinical guidelines outlining when physician involvement in verification of patient positioning is needed. No clinical outcomes are discussed.

Clinical Indications

Image guidance, any modality, is appropriate when ANY of the following conditions are met:

- Intensity modulated radiation therapy (IMRT) is being utilized
- Proton beam therapy is being utilized
- Use of IGRT will allow significant reduction of radiation dose to sensitive normal structures, for example:
 - Left-sided breast cancer treatment with deep inspiration breath hold technique (DIBH) for cardiac sparing is being utilized
- Implanted fiducial markers have been placed
- Bony anatomy fails to accurately delineate a tumor location and fiducial markers or intensity modulated radiation therapy (IMRT) are not indicated (for example, head and neck cancer or prone breast radiotherapy)
- The treatment field abuts a previously irradiated field
- There is significant setup variation affecting the treatment target, for example:
 - Individual is morbidly obese (BMI > 35) and receiving treatment of tumors in the mediastinum, abdomen or pelvis
 - There is significant organ movement due to respiration and a 4D planning CT scan was performed with documentation demonstrating that the treatment plan addresses tumor motion that is both accounted for and managed

Note: Image guidance not meeting any of the above criteria is considered not medically necessary.

Frequency

When authorized, image guidance should be performed at the minimum frequency needed to assure proper patient positioning.

Codes

CPT® (Current Procedural Terminology) is a registered trademark of the American Medical Association (AMA). CPT® five digit codes, nomenclature and other data are copyright by the American Medical Association. All Rights Reserved. AMA does not directly or indirectly practice medicine or dispense medical services. AMA assumes no liability for the data contained herein or not contained herein.

The following codes for treatments and procedures applicable to this document are included below for informational purposes. Inclusion or exclusion of a procedure, diagnosis or device code(s) does not constitute or imply member coverage or provider reimbursement policy. Please refer to the member's contract benefits in effect at the time of service to determine coverage or non-coverage of these services as it applies to an individual member.

The following code list is not meant to be all-inclusive. Authorization requirements will vary by health plan. Please consult the applicable health plan for guidance on specific procedure codes.

Specific CPT codes for services should be used when available. Nonspecific or not otherwise classified codes may be subject to additional documentation requirements and review.

CPT/HCPCS

Note: The work associated with CT scan acquisition for 3D or IMRT planning is bundled with codes 77295 and 77301, respectively. CPT code 77014 should NOT be billed in this setting.

- 77014 CT guidance for placement of radiation therapy fields
- 77387 Guidance for localization of target volume for delivery of radiation treatment delivery, includes intrafraction tracking, when performed
- G6001 Ultrasonic guidance for placement of radiation therapy fields
- G6002 Stereoscopic x-ray guidance for localization of target volume for the delivery of radiation therapy
- G6017 Intra-fraction localization and tracking of target or patient motion during delivery of radiation therapy (e.g., 3D positional tracking, gating, 3D surface tracking), each fraction of treatment

ICD-10 Diagnoses

All inclusive

References

1. Alongi, F, Fiorino, C, Cozzarini, C, et al. IMRT significantly reduces acute toxicity of whole-pelvis irradiation in patients treated with post-operative adjuvant or salvage radiotherapy after radical prostatectomy. *Radiother Oncol*. 2009;93(2):207-12.
2. American Society for Radiation Oncology (ASTRO). IGRT [Internet] [cited 2020 Feb 24]. Available from: <https://www.astro.org/Daily-Practice/Coding/Coding-Guidance/FAQ-IGRT/>.
3. American Society for Radiation Oncology (ASTRO). Image guided radiation therapy (IGRT) coding guidance [Internet] [cited 2020 Aug 14]. Available from: <https://www.astro.org/Daily-Practice/Coding/Coding-Guidance/Coding-Guidance-Articles/IGRT-in-2016>.
4. Borst, GR, Sonke, JJ, den Hollander, S, et al. Clinical results of image-guided deep inspiration breath hold breast irradiation. *Int J Radiat Oncol Biol Phys*. 2010;78(5):1345-51.
5. Chen, AM, Farwell, DG, Luu, Q, et al. Evaluation of the planning target volume in the treatment of head and neck cancer with intensity-modulated radiotherapy: what is the appropriate expansion margin in the setting of daily image guidance? *Int J Radiat Oncol Biol Phys*. 2011;81(4):943-9.
6. Chen, AM, Yu, Y, Daly, ME, et al. Long-term experience with reduced planning target volume margins and intensity-modulated radiotherapy with daily image-guidance for head and neck cancer. *Head Neck*. 2014;36(12):1766-72.
7. Chung, HT, Xia, P, Chan, LW, et al. Does image-guided radiotherapy improve toxicity profile in whole pelvic-treated high-risk prostate cancer? Comparison between IG-IMRT and IMRT. *Int J Radiat Oncol Biol Phys*. 2009;73(1):53-60.
8. Comsa, D, Barnett, E, Le, K, et al. Introduction of moderate deep inspiration breath hold for radiation therapy of left breast: Initial experience of a regional cancer center. *Pract Radiat Oncol*. 2014;4(5):298-305.
9. Dawson, LA, Jaffray, DA. Advances in image-guided radiation therapy. *J Clin Oncol*. 2007;25(8):938-46.
10. de Crevoisier, R, Bayar, MA, Pommier, P, et al. Daily versus weekly prostate cancer image guided radiation therapy: phase 3 multicenter randomized trial. *Int J Radiat Oncol Biol Phys*. 2018;102(5):1420-9.
11. Dearnaley, D, Syndikus, I, Mossop, H, et al. Conventional versus hypofractionated high-dose intensity-modulated radiotherapy for prostate cancer: 5-year outcomes of the randomised, non-inferiority, phase 3 CHHiP trial. *Lancet Oncol*. 2016;17(8):1047-60.
12. Eldredge, HB, Studenski, M, Keith, SW, et al. Post-prostatectomy image-guided radiation therapy: evaluation of toxicity and inter-fraction variation using online cone-beam CT. *J Med Imaging Radiat Oncol*. 2011;55(5):507-15.
13. Goyal, S, Kataria, T. Image guidance in radiation therapy: techniques and applications. *Radiology Research & Practice Print*. 2014;2014:705604.
14. Graff, P, Hu, W, Yom, SS, et al. Does IGRT ensure target dose coverage of head and neck IMRT patients? *Radiother Oncol*. 2012;104(1):83-90.
15. Hsieh, CH, Shueng, PW, Wang, LY, et al. Impact of postoperative daily image-guided intensity-modulated radiotherapy on overall and local progression-free survival in patients with oral cavity cancer. *BMC Cancer*. 2016;16:139.
16. Jaffray, D, Kupelian, P, Djemil, T, et al. Review of image-guided radiation therapy. *Expert Rev Anticancer Ther*. 2007;7(1):89-103.
17. Jaffray, DA, Langen, KM, Mageras, G, et al. Safety considerations for IGRT: Executive summary. *Pract Radiat Oncol*. 2013;3(3):167-70.
18. Kan, MW, Leung, LH, Wong, W, et al. Radiation dose from cone beam computed tomography for image-guided radiation therapy. *Int J Radiat Oncol Biol Phys*. 2008;70(1):272-9.
19. Keall, PJ, Mageras, GS, Balter, JM, et al. The management of respiratory motion in radiation oncology report of AAPM Task Group 76. *Med Phys*. 2006;33(10):3874-900.
20. Lavoie, C, Higgins, J, Bissonnette, JP, et al. Volumetric image guidance using carina vs spine as registration landmarks for conventionally fractionated lung radiotherapy. *Int J Radiat Oncol Biol Phys*. 2012;84(5):1086-92.
21. Lemanski, C, Thariat, J, Ampil, FL, et al. Image-guided radiotherapy for cardiac sparing in patients with left-sided breast cancer. *Frontiers in Oncology*. 2014;4:257.
22. Liao, ZX, Komaki, RR, Thames, HD, Jr., et al. Influence of technologic advances on outcomes in patients with unresectable, locally advanced non-small-cell lung cancer receiving concomitant chemoradiotherapy. *Int J Radiat Oncol Biol Phys*. 2010;76(3):775-81.
23. Liu, HH, Balter, P, Tutt, T, et al. Assessing respiration-induced tumor motion and internal target volume using four-dimensional computed tomography for radiotherapy of lung cancer. *Int J Radiat Oncol Biol Phys*. 2007;68(2):531-40.
24. Lohr, F, El-Haddad, M, Dobler, B, et al. Potential effect of robust and simple IMRT approach for left-sided breast cancer on cardiac mortality. *Int J Radiat Oncol Biol Phys*. 2009;74(1):73-80.
25. Millender, LE, Aubin, M, Pouliot, J, et al. Daily electronic portal imaging for morbidly obese men undergoing radiotherapy for localized prostate cancer. *Int J Radiat Oncol Biol Phys*. 2004;59(1):6-10.

26. Murphy, MJ, Balter, J, Balter, S, et al. The management of imaging dose during image-guided radiotherapy: report of the AAPM Task Group 75. *Med Phys*. 2007;34(10):4041-63.
27. NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines®) for Breast Cancer (Version 4.2020). Available at <http://www.nccn.org>. ©National Comprehensive Cancer Network, 2020.
28. NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines®) for Non-Small Cell Lung Cancer (Version 4.2020). Available at <http://www.nccn.org>. ©National Comprehensive Cancer Network, 2020.
29. Osman, SO, de Boer, HC, Astreinidou, E, et al. On-line cone beam CT image guidance for vocal cord tumor targeting. *Radiother Oncol*. 2009;93(1):8-13.
30. Ploquin, N, Song, W, Lau, H, et al. Intensity modulated radiation therapy for oropharyngeal cancer: the sensitivity of plan objectives and constraints to set-up uncertainty. *Phys Med Biol*. 2005;50(15):3515-33.
31. Pollack, A, Zagars, GK, Starkschall, G, et al. Prostate cancer radiation dose response: results of the M. D. Anderson phase III randomized trial. *Int J Radiat Oncol Biol Phys*. 2002;53(5):1097-105.
32. Potters, L, Gaspar, LE, Kavanagh, B, et al. American Society for Therapeutic Radiology and Oncology (ASTRO) and American College of Radiology (ACR) practice guidelines for image-guided radiation therapy (IGRT). *Int J Radiat Oncol Biol Phys*. 2010;76(2):319-25.
33. Potters, L, Kavanagh, B, Galvin, JM, et al. American Society for Therapeutic Radiology and Oncology (ASTRO) and American College of Radiology (ACR) practice guideline for the performance of stereotactic body radiation therapy. *Int J Radiat Oncol Biol Phys*. 2010;76(2):326-32.
34. Ratnayake, G, Martin, J, Plank, A, et al. Incremental changes verses a technological quantum leap: the additional value of intensity-modulated radiotherapy beyond image-guided radiotherapy for prostate irradiation. *J Med Imaging Radiat Oncol*. 2014;58(4):503-10.
35. Rock, K, Huang, SH, Tjong, A, et al. Partial laryngeal IMRT for T2N0 glottic cancer: impact of image guidance and radiation therapy intensification. *Int J Radiat Oncol Biol Phys*. 2018;102(4):941-9.
36. Schallenkamp, JM, Herman, MG, Kruse, JJ, et al. Prostate position relative to pelvic bony anatomy based on intraprostatic gold markers and electronic portal imaging. *Int J Radiat Oncol Biol Phys*. 2005;63(3):800-11.
37. Shah, A, Aird, E, Shekhdar, J. Contribution to normal tissue dose from concomitant radiation for two common kV-CBCT systems and one MVCT system used in radiotherapy. *Radiother Oncol*. 2012;105(1):139-44.
38. Singh, J, Greer, PB, White, MA, et al. Treatment-related morbidity in prostate cancer: a comparison of 3-dimensional conformal radiation therapy with and without image guidance using implanted fiducial markers. *Int J Radiat Oncol Biol Phys*. 2013;85(4):1018-23.
39. Veldeman, L, Madani, I, Hulstaert, F, et al. Evidence behind use of intensity-modulated radiotherapy: a systematic review of comparative clinical studies. *Lancet Oncol*. 2008;9(4):367-75.
40. Wang, D, Zhang, Q, Eisenberg, BL, et al. Significant Reduction of Late Toxicities in Patients With Extremity Sarcoma Treated With Image-Guided Radiation Therapy to a Reduced Target Volume: Results of Radiation Therapy Oncology Group RTOG-0630 Trial. *J Clin Oncol*. 2015;33(20):2231-8.
41. Wang, W, Purdie, TG, Rahman, M, et al. Rapid automated treatment planning process to select breast cancer patients for active breathing control to achieve cardiac dose reduction. *Int J Radiat Oncol Biol Phys*. 2012;82(1):386-93.
42. Wong, JR, Gao, Z, Merrick, S, et al. Potential for higher treatment failure in obese patients: correlation of elevated body mass index and increased daily prostate deviations from the radiation beam isocenters in an analysis of 1,465 computed tomographic images. *Int J Radiat Oncol Biol Phys*. 2009;75(1):49-55.
43. Wortel, RC, Incrocci, L, Pos, FJ, et al. Acute toxicity after image-guided intensity modulated radiation therapy compared to 3D conformal radiation therapy in prostate cancer patients. *Int J Radiat Oncol Biol Phys*. 2015;91(4):737-44.
44. Zelefsky, MJ, Kollmeier, M, Cox, B, et al. Improved clinical outcomes with high-dose image guided radiotherapy compared with non-IGRT for the treatment of clinically localized prostate cancer. *Int J Radiat Oncol Biol Phys*. 2012;84(1):125-9.
45. Zelefsky, MJ, Levin, EJ, Hunt, M, et al. Incidence of late rectal and urinary toxicities after three-dimensional conformal radiotherapy and intensity-modulated radiotherapy for localized prostate cancer. *Int J Radiat Oncol Biol Phys*. 2008;70(4):1124-9.

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These Guidelines are a work in progress that may be refined as often as new significant data becomes available.

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Special Treatment Procedure and Special Physics Consult

General Information

Radiation Oncology Considerations

Special treatment procedure, CPT® code 77470, describes the extra time, effort and resources associated with complex radiation therapy procedures and situations which are not reimbursed by another CPT® code. Several of these procedures are specifically described in the CPT® code definition including total body irradiation, hemibody radiation and per oral or endocavitary radiation. This code may also be used to report additional work and effort when a patient receives brachytherapy or concurrent chemotherapy along with a course of external beam radiation therapy. This code should not be used to report the work effort which is specifically described another CPT® code including but not limited to intensity modulated radiation therapy (IMRT), stereotactic radiosurgery (SRS) or intraoperative radiation therapy (IORT).

Special physics consult, CPT® code 77370, describes work performed by a qualified medical physicist to address a specific question or problem related to a complex radiation therapy plan. This only applies when the query to the physicist is beyond the scope of the routine physics work effort associated with radiation therapy planning and delivery. In response to a physician request, the physicist prepares a customized written report specifically addressing the issue in question. A special physics consult may be appropriate in cases of brachytherapy where the physicist is directly involved or when an a composite plan is generated by the physicist to reflect cumulative doses from different radiation modalities such as photons, electrons, charges particles and gamma rays. A special physics consult is also medically necessary when radiation dose to a fetus or medical device such as pacemaker needs to be measured. Special physics consult is appropriate when the physicist performs a fusion multiple images sets with or without associated dose distributions to be used by the physician in the development or analysis of a treatment plan. This code should not be used when fusion is performed by a non-physicist. A special physics consult may also apply to other specific treatment-related questions when ordered by the radiation oncologist and appropriate documentation is provided.

Clinical Indications

Special treatment procedure is indicated when extra planning time and effort can be documented for ANY of the following:

- Concurrent chemotherapy
- Brachytherapy
- Proton therapy
- Total body or hemibody radiation
- Pediatric patient requiring anesthesia
- Hyperthermia
- Reconstruction of previous radiation plan
- Stereotactic body radiation therapy (SBRT)
- Other (documentation of special circumstances or time consuming plan required)

Special physics consult is indicated when requested by physician for ANY of the following:

- Brachytherapy
- Fusion of multiple image sets (CT, MRI, PET) when performed by the medical physicist

- Dosimetric analysis of previous radiation field overlapping or abutting current field
- Analysis of dose to a fetus
- Analysis of dose to a pacemaker
- Stereotactic radiosurgery (SRS) or stereotactic body radiation therapy (SBRT) with report of dosimetric parameters and specific organ tolerances met or exceeded
- Other specific physics work not described by another CPT code, at request of radiation oncologist

Frequency

Special treatment procedure and special physics consults may each only be billed once per course of therapy

Codes

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CPT/HCPCS

77370 Special medical radiation physics consultation

77470 Special treatment procedure

ICD-10 Diagnoses

All inclusive

References

1. American Society for Radiation Oncology (ASTRO). 2020 radiation oncology coding resource [Internet] 2020 [cited 2020 May 18]. Available from: <https://www.astro.org/Daily-Practice/Coding/Coding-Resource>.

Bone Metastases

General Information

Commonly Used Modalities

External Beam Radiation Therapy

- 2D and 3D conformal (EBRT)
- Intensity Modulated Radiation Therapy (IMRT)
- Stereotactic Body Radiation Therapy (SBRT)

Radiation Oncology Considerations

Initial treatment

Metastasis to the bony skeleton is a common site of spread for many solid tumors including breast, prostate and lung cancers. Bone metastases can be seen with any cancer histology and affects more than 250,000 patients per year in the U.S. It has been estimated that up to 80% of patients with solid cancers will develop painful bone metastases to the pelvis, spine or extremities during the course of their illness. Metastases to the bone can cause accelerated bone breakdown which may result in pain, pathologic fracture and nerve or spinal cord compression resulting in sensory loss or motor weakness. Laboratory abnormalities may include hypercalcemia and myelosuppression. Radiation therapy has long been used to palliate pain and other symptoms of bone metastases with excellent results.

There have been multiple prospective, randomized, controlled clinical trials comparing different radiation fractionation schemes for bony metastases. Most of these trials have excluded patients with spinal cord compression or pathologic fracture at presentation. All of these trials, as well as several subsequent meta-analyses of these data, have concluded that for uncomplicated patients a single fraction of 8 Gy provides equivalent palliation to more prolonged fractionation over 1 to 4 weeks. The overall response rate with either regimen was approximately 60% with about 24% of patients demonstrating a complete response to treatment. Acute toxicity was found to be equivalent or better in the single fraction arms. There was no significant difference in pathologic fracture risk or subsequent spinal cord compression. The main difference which has been demonstrated is a higher rate of re-treatment with single fraction treatment vs more prolonged fractionation (20% vs 8%).

Because of the higher rate of re-treatment with single fraction radiotherapy, the use of fractionated regimens has been suggested for patients with bony metastasis from prostate and breast cancers. Analysis of the Dutch Bone Metastasis Study found equal pain relief and duration in patients with favorable prognosis. This has also been studied prospectively by the RTOG which looked specifically at whether prolonged fractionation resulted in superior palliation in patients with breast and prostate cancers. It was concluded that both single fraction and multifraction regimens were equally effective even in this favorable group of patients. The breast cancer expert panel of the German Society for Radiation Oncology (DEGRO) recommends fractionated regimens for breast cancer patients with oligometastatic bony metastasis and when the therapeutic goal is stabilization of disease as opposed to pain control. The NCCN guidelines for prostate cancer recommend that 8 Gy as a single dose be used instead of 30 Gy in 10 fractions for non-vertebral metastases.

In 2011, ASTRO published a guideline providing recommendations for palliative radiotherapy as a treatment for bone metastases. ASTRO's recommendations were based on the findings of their systematic review of the peer-reviewed literature on palliative RT for bone metastases combined with the expert opinion of the Task Force members. With regards to the most effective fractionation scheme for the treatment of painful and/or prevention of morbidity from peripheral bone metastases, the ASTRO task force indicated that: "Multiple prospective randomized trials have shown pain relief equivalency for dosing schema, including 30 Gy in 10 fractions, 24 Gy in 6 fractions, 20 Gy in 5 fractions, and a single 8-Gy fraction for patients with previously unirradiated painful bone metastases. Fractionated RT courses have been associated with an 8% repeat treatment rate to the same anatomic site because of recurrent pain vs. 20% after a single fraction; however, the single fraction treatment approach optimizes patient and caregiver convenience."

ASTRO recently published an update of their evidence-based guideline which reviewed 20 new randomized trials, 32 new prospective non-randomized trials and 4 meta-analyses. The literature continues to support the equivalent pain relief of a single 8 Gy treatment compared to multifraction therapy.

Special circumstances have been suggested where more prolonged fractionation may be preferable. These include individuals with soft tissue involvement causing neuropathic symptoms, spinal metastases, impending or outright spinal cord compression, and presence of oligometastatic disease. Most of these trials exploring different radiation fractionation schemes for bony metastases have excluded subjects with spinal cord compression or pathologic fracture at presentation.

The study by Roos et al. looked at single fraction vs fractionated radiotherapy for patients with neuropathic pain and found that the time to treatment failure was shorter in the single fraction regimen. The risk of developing spinal cord compression in patients with vertebral bony metastasis has been found to be slightly higher with single fraction treatment, although this did not reach statistical significance and the overall risk of cord compression was less than 6% in both groups. Recently published results of the SCORAD randomized trial of 8 Gy single fraction treatment vs 20 Gy in five fractions in patients with spinal cord compression demonstrated that the single fraction treatment was non-inferior in terms of return to ambulatory status and survival.

ASTRO indicated that while many of the peer-reviewed studies did not make a distinction between treatment relief for spinal vs non-spinal metastases, the task force was able to conclude that there was no evidence to suggest that a single 8-Gy fraction was less effective in providing pain relief than a more prolonged RT course in painful spinal sites. The authors also concluded that there were not “any suggestions from the available data that single-fraction therapy produces unacceptable rates of long-term side effects that might limit this fractionation schedule for patients with painful bone metastases.”

A recent report by Lam explores factors affecting adverse outcomes in 299 patients receiving palliative radiotherapy for uncomplicated spine metastases. The cumulative incidence of first skeletal adverse event (SAE) at 180 days was 23.6% for single fraction (SF) radiation vs 9.2% for multiple fraction (MF) treatment. On multivariate analysis, single fraction treatment (HR 2.8, $P = .001$) and baseline spine instability score (HR 2.5, $P = .007$) were significant predictors of the incidence of first SAE. To account for baseline differences, outcomes were compared using a propensity score matched analysis. They found that the 90 day incidence of SAEs was 22% for patients treated with SF radiotherapy vs 6% for patients treated with a MF regimen (HR 3.9, $P = .003$). Spinal adverse events were defined as a symptomatic fracture, hospitalization for site-related pain, salvage surgery, interventional procedure, new neurologic symptoms or cord compression.

Radiation therapy is a common treatment for metastatic spinal cord compression. In patients with a single site of compression and life expectancy of at least 3 months, surgical decompression should be considered as it has been shown to preserve neurologic function better than radiotherapy alone in a phase III randomized study. Post-operative radiotherapy should be given in these patients. 30 Gy in 10 fractions has been the most commonly used. No reports have been published regarding the use of single fraction palliative EBRT in the post-operative setting. For patients who are not candidates for surgery, radiation therapy should be given after initiation of corticosteroid therapy. A recent review of radiation therapy for metastatic spinal cord compression concluded that for patients with a poor prognosis, a single fraction of 8 Gy should be given. For those with patients with a good prognosis, consideration of 30 Gy in 10 fractions was recommended.

When a metastasis results in a pathologic compression fracture, percutaneous kyphoplasty may be of benefit. The ASTRO evidence based guideline concluded that no prospective data are available to suggest that the use of either kyphoplasty or vertebroplasty obviates the need for EBRT in the management of painful bone metastases.

Stereotactic body radiation therapy (SBRT) or stereotactic ablative body radiotherapy (SABR) is being studied in the treatment of bony metastatic disease. Proposed indications for this modality include standalone or postoperative treatment in patients with progressive or recurrent disease following conventional external beam radiotherapy (cEBRT) and in the treatment of tumors traditionally considered radioresistant to cEBRT such as sarcoma, melanoma and renal cell carcinoma. The RTOG is currently conducting a comparison of SBRT with a single fraction of 8 Gy for painful vertebral metastasis. The updated ASTRO evidence-based guideline maintains that: “Advanced RT techniques such as SBRT as the primary treatment for painful spine bone lesions or for spinal cord compression should be considered in the setting of a clinical trial or with data collected in a registry given that insufficient data are available to routinely support this treatment currently.”

Repeat treatment

Following initial treatment with radiation therapy for bony metastasis, some patients will develop recurrent or progressive symptoms for which additional radiation therapy is indicated. Studies have shown repeat radiation therapy to be effective in reducing pain in approximately 48% of patients. Responders have been shown to have improved quality of life. When a given site is re-treated, the effect of prior irradiation on the surrounding normal tissues must be taken into account. This is especially important when treating vertebral lesions where to cumulative dose to the spinal cord must be minimized. The generally accepted maximum cumulative dose to the spinal cord is 50 Gy in 2 Gy fractions (or equivalent). If repeat radiation using 2D or 3D techniques would result in a cumulative dose to the spinal cord greater than 50 Gy in 2 Gy fractions then consideration should be given to intensity modulated radiation therapy (IMRT), stereotactic radiosurgery (SRS), or stereotactic body radiation therapy (SBRT).

Society Recommendations

ASTRO – The 2013 Choosing Wisely campaign included as one of its 5 recommendations that fractionation beyond 10 treatments should not be routinely used to treat bone metastases. They noted that 8 Gy in a single fraction results in equivalent pain relief compared to 20 Gy in 5 fractions or 30 Gy in 10 fractions. They suggested that strong consideration be given to 8 Gy in a single fraction for patient with poor prognosis or transportation difficulties.

ACR – The American College of Radiology has published Appropriateness Criteria for both spinal and non-spinal bone metastases. They note that radiation therapy is the mainstay of treatment for bony metastatic lesions. They list several fractionation regimens including 30 Gy in 10 fractions, 24 Gy in 6 fractions, 20 Gy in 5 fractions, or a single 8 Gy fraction. They note that randomized clinical trials have shown equivalent pain relief for all of these regimens.

Clinical Indications

2D or 3D Conformal External Beam Radiation Therapy (EBRT) is appropriate for bone metastases when ANY one of the following conditions are met:

- Pain at the site of metastasis
- Lytic lesion involving a weight bearing bone
- Spinal cord compression
- Post-operative treatment following surgical stabilization

Intensity Modulated Radiation Therapy (IMRT) is appropriate for bone metastases when ALL of the following conditions are met:

- To treat a previously irradiated field
- Re-treatment with EBRT would result in significant risk of adjacent organ injury

Stereotactic Radiosurgery (SRS) or Stereotactic Body Radiation Therapy (SBRT) is appropriate for bone metastasis when ALL of the following conditions are met:

- To treat a previously irradiated field
- Re-treatment with EBRT would result in significant risk of adjacent organ injury

Note: When SRS/SBRT is being requested to treat a patient with oligometastatic disease with potentially curative intent, please refer to separate criteria in the Oligometastatic Extracranial Disease section of the Guidelines.

Fractionation

Single fraction treatment is appropriate in individuals who meet the following criterion:

- Goal of therapy is pain relief

Fractionated radiotherapy, 2 to 10 fractions, is only appropriate in individuals who meet the following criteria:

- Fair to good performance status, defined as ECOG status 0-2 and any of the following:
 - Pathologic fracture
 - Soft tissue involvement by tumor
 - Spinal cord compression
 - Spine metastasis
 - Presence of oligometastatic disease (1-5 lesions) when the goal of treatment is long term stabilization of disease

Fractionation beyond 10 treatments is not medically necessary

Codes

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2D and 3D Conformal

CPT/HCPCS

77295	3-dimensional radiotherapy plan, including dose-volume histograms (3D Conformal treatment plan)
77402	Radiation treatment delivery, > 1 MeV; simple.
77407	Radiation treatment delivery, > 1 MeV; intermediate.
77412	Radiation treatment delivery, > 1 MeV; complex.
G6003	Radiation treatment delivery, single treatment area, single port or parallel opposed ports, simple blocks or no blocks: up to 5 MeV
G6004	Radiation treatment delivery, single treatment area, single port or parallel opposed ports, simple blocks or no blocks: 6-10 MeV
G6005	Radiation treatment delivery, single treatment area, single port or parallel opposed ports, simple blocks or no blocks: 11-19 MeV
G6006	Radiation treatment delivery, single treatment area, single port or parallel opposed ports, simple blocks or no blocks: 20 MeV or greater
G6007	Radiation treatment delivery, 2 separate treatment areas, 3 or more ports on a single treatment area, use of multiple blocks: up to 5 MeV
G6008	Radiation treatment delivery, 2 separate treatment areas, 3 or more ports on a single treatment area, use of multiple blocks: 6-10 MeV
G6009	Radiation treatment delivery, 2 separate treatment areas, 3 or more ports on a single treatment area, use of multiple blocks: 11-19 MeV
G6010	Radiation treatment delivery, 2 separate treatment areas, 3 or more ports on a single treatment area, use of multiple blocks: 20 MeV or greater
G6011	Radiation treatment delivery, 3 or more separate treatment areas, custom blocking, tangential ports, wedges, rotational beam, compensators, electron beam; up to 5 MeV
G6012	Radiation treatment delivery, 3 or more separate treatment areas, custom blocking, tangential ports, wedges, rotational beam, compensators, electron beam; 6-10 MeV

- G6013 Radiation treatment delivery, 3 or more separate treatment areas, custom blocking, tangential ports, wedges, rotational beam, compensators, electron beam; 11-19 MeV
- G6014 Radiation treatment delivery, 3 or more separate treatment areas, custom blocking, tangential ports, wedges, rotational beam, compensators, electron beam; 20 MeV or greater

Intensity Modulated Radiation Therapy

CPT/HCPCS

- 77301 Intensity modulated radiation therapy plan, including dose volume histogram for target and critical structure partial tolerance specifications (IMRT treatment plan)
- 77338 Multi-leaf collimator (MLC) device(s) for intensity modulated radiation therapy (IMRT), design and construction per IMRT plan
- 77386 Intensity modulated radiation treatment delivery (IMRT), includes guidance and tracking when performed; complex
- G6015 Intensity modulated Treatment delivery, single or multiple fields/arcs, via narrow spatially and temporally modulated beams, binary, dynamic MLC, per treatment session
- G6016 Compensator-based beam modulation treatment delivery of inverse planned treatment using 3 or more high resolution (milled or cast) compensator convergent beam modulated fields, per treatment session

Stereotactic Body Radiation Therapy

CPT/HCPCS

- 63620 Stereotactic radiosurgery (particle beam, gamma ray, or linear accelerator); one spinal lesion
- 63621 Stereotactic radiosurgery (particle beam, gamma ray, or linear accelerator); each add'l spinal lesion
- 77295 3-dimensional radiotherapy plan, including dose-volume histograms (3D Conformal treatment plan)
- 77301 Intensity modulated radiation therapy plan, including dose volume histogram for target and critical structure partial tolerance specifications (IMRT treatment plan)
- 77338 Multi-leaf collimator (MLC) device(s) for intensity modulated radiation therapy (IMRT), design and construction per IMRT plan
- 77370 Special medical radiation physics consultation
- 77373 Stereotactic body radiation therapy, treatment delivery, per fraction to 1 or more lesions, including image guidance, entire course not to exceed 5 fractions
- 77435 Stereotactic body radiation therapy, treatment management, per treatment course, to 1 or more lesions, including image guidance, entire course not to exceed 5 fractions
- 77470 Special treatment procedure
- G0339 Image-guided robotic linear accelerator-based stereotactic radiosurgery, complete course of therapy in one session or first session of fractionated treatment
- G0340 Image-guided robotic linear accelerator based stereotactic radiosurgery, delivery including collimator changes and custom plugging, fractionated treatment, all lesions, per session, second through fifth sessions; maximum five sessions per course of treatment

Stereotactic Radiosurgery

CPT/HCPCS

- 63620 Stereotactic radiosurgery (particle beam, gamma ray, or linear accelerator); one spinal lesion
- 63621 Stereotactic radiosurgery (particle beam, gamma ray, or linear accelerator); each add'l spinal lesion
- 77295 3-dimensional radiotherapy plan, including dose-volume histograms
- 77301 Intensity modulated radiotherapy plan, including dose-volume histograms for target and critical structure partial tolerance specifications (Listed once only)
- 77338 Multi-leaf collimator (MLC) device(s) for intensity modulated radiation therapy (IMRT), design and construction per IMRT plan
- 77370 Special medical radiation physics consultation
- 77371 Radiation treatment delivery, stereotactic radiosurgery (SRS) complete course of treatment of cranial lesion(s) consisting of 1 session; multi-source Cobalt 60 based
- 77372 Radiation treatment delivery, stereotactic radiosurgery (SRS) complete course of treatment of cranial lesion(s) consisting of 1 session; linear accelerator based
- 77432 Stereotactic radiation treatment management of cranial lesion(s) (complete course of treatment consisting of 1 session)

- G0339 Image-guided robotic linear accelerator-based stereotactic radiosurgery, complete course of therapy in one session or first session of fractionated treatment
- G0340 Image-guided robotic linear accelerator based stereotactic radiosurgery, delivery including collimator changes and custom plugging, fractionated treatment, all lesions, per session, second through fifth sessions; maximum five sessions per course of treatment

All Modalities

ICD-10 Diagnoses

C79.51 - C79.52 ... Secondary malignant neoplasm of bone and bone marrow

References

1. Anonymous. 8 Gy single fraction radiotherapy for the treatment of metastatic skeletal pain: randomised comparison with a multifraction schedule over 12 months of patient follow-up. Bone Pain Trial Working Party. *Radiother Oncol.* 1999;52(2):111-21.
2. Chan, NK, Abdullah, KG, Lubelski, D, et al. Stereotactic radiosurgery for metastatic spine tumors. *J Neurosurg Sci.* 2014;58(1):37-44.
3. Chow, E, Meyer, RM, Chen, BE, et al. Impact of reirradiation of painful osseous metastases on quality of life and function: a secondary analysis of the NCIC CTG SC.20 randomized trial. *J Clin Oncol.* 2014;32(34):3867-73.
4. Chow, E, Zeng, L, Salvo, N, et al. Update on the systematic review of palliative radiotherapy trials for bone metastases. *Clin Oncol (R Coll Radiol).* 2012;24(2):112-24.
5. Dennis, K, Makhani, L, Zeng, L, et al. Single fraction conventional external beam radiation therapy for bone metastases: a systematic review of randomised controlled trials. *Radiother Oncol.* 2013;106(1):5-14.
6. Expert Panel on Radiation Oncology-Bone, M, Lo, SS, Lutz, ST, et al. ACR Appropriateness Criteria R spinal bone metastases. *J Palliat Med.* 2013;16(1):9-19.
7. Foro Arnalot, P, Fontanals, AV, Galceran, JC, et al. Randomized clinical trial with two palliative radiotherapy regimens in painful bone metastases: 30 Gy in 10 fractions compared with 8 Gy in single fraction. *Radiother Oncol.* 2008;89(2):150-5.
8. Gaze, MN, Kelly, CG, Kerr, GR, et al. Pain relief and quality of life following radiotherapy for bone metastases: a randomised trial of two fractionation schedules. *Radiother Oncol.* 1997;45(2):109-16.
9. Hartsell, WF, Scott, CB, Bruner, DW, et al. Randomized trial of short- versus long-course radiotherapy for palliation of painful bone metastases. *J Natl Cancer Inst.* 2005;97(11):798-804.
10. Hoskin, PJ, Grover, A, Bhana, R. Metastatic spinal cord compression: radiotherapy outcome and dose fractionation. *Radiother Oncol.* 2003;68(2):175-80.
11. Hoskin, PJ, Hopkins, K, Misra, V, et al. Effect of single-fraction vs multifraction radiotherapy on ambulatory status among patients with spinal canal compression from metastatic cancer: the SCORAD randomized clinical trial. *JAMA.* 2019;322(21):2084-94.
12. Husain, ZA, Sahgal, A, De Salles, A, et al. Stereotactic body radiotherapy for de novo spinal metastases: systematic review. *J Neurosurg Spine.* 2017;27(3):295-302.
13. Jeremic, B, Shibamoto, Y, Acimovic, L, et al. A randomized trial of three single-dose radiation therapy regimens in the treatment of metastatic bone pain. *Int J Radiat Oncol Biol Phys.* 1998;42(1):161-7.
14. Kaasa, S, Brenne, E, Lund, JA, et al. Prospective randomised multicenter trial on single fraction radiotherapy (8 Gy x 1) versus multiple fractions (3 Gy x 10) in the treatment of painful bone metastases. *Radiother Oncol.* 2006;79(3):278-84.
15. Kim, EY, Chapman, TR, Ryu, S, et al. ACR Appropriateness Criteria(R) non-spine bone metastases. *J Palliat Med.* 2015;18(1):11-7.
16. Lam, TC, Uno, H, Krishnan, M, et al. Adverse Outcomes After Palliative Radiation Therapy for Uncomplicated Spine Metastases: Role of Spinal Instability and Single-Fraction Radiation Therapy. *Int J Radiat Oncol Biol Phys.* 2015;93(2):373-81.
17. Li, S, Peng, Y, Weinhandl, ED, et al. Estimated number of prevalent cases of metastatic bone disease in the US adult population. *Clin Epidemiol.* 2012;4:87-93.
18. Loblaw, DA, Mitera, G, Ford, M, et al. A 2011 updated systematic review and clinical practice guideline for the management of malignant extradural spinal cord compression. *Int J Radiat Oncol Biol Phys.* 2012;84(2):312-7.
19. Lutz, S, Balboni, T, Jones, J, et al. Palliative radiation therapy for bone metastases: Update of an ASTRO Evidence-Based Guideline. *Pract Radiat Oncol.* 2017;7(1):4-12.
20. NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines®) for Prostate Cancer (Version 1.2020). Available at <http://www.nccn.org>. ©National Comprehensive Cancer Network, 2020. Ogawa, H, Ito, K, Shimizuguchi, T, et al. Re-irradiation for painful bone metastases using stereotactic body radiotherapy. *Acta Oncol.* 2018;57(12):1700-4.
21. Nielsen, OS, Bentzen, SM, Sandberg, E, et al. Randomized trial of single dose versus fractionated palliative radiotherapy of bone metastases. *Radiother Oncol.* 1998;47(3):233-40.

22. Ogawa, H, Ito, K, Shimizuguchi, T, et al. Re-irradiation for painful bone metastases using stereotactic body radiotherapy. *Acta Oncol.* 2018;57(12):1700-4.
23. Patchell, RA, Tibbs, PA, Regine, WF, et al. Direct decompressive surgical resection in the treatment of spinal cord compression caused by metastatic cancer: a randomised trial. *Lancet.* 2005;366(9486):643-8.
24. Roos, DE, Turner, SL, O'Brien, PC, et al. Randomized trial of 8 Gy in 1 versus 20 Gy in 5 fractions of radiotherapy for neuropathic pain due to bone metastases (Trans-Tasman Radiation Oncology Group, TROG 96.05). *Radiother Oncol.* 2005;75(1):54-63.
25. Schulman, KL, Kohles, J. Economic burden of metastatic bone disease in the U.S. *Cancer.* 2007;109(11):2334-42.
26. Singh, D, Yi, WS, Brasacchio, RA, et al. Is there a favorable subset of patients with prostate cancer who develop oligometastases? *Int J Radiat Oncol Biol Phys.* 2004;58(1):3-10.
27. Souchon, R, Feyer, P, Thomssen, C, et al. Clinical Recommendations of DEGRO and AGO on Preferred Standard Palliative Radiotherapy of Bone and Cerebral Metastases, Metastatic Spinal Cord Compression, and Leptomeningeal Carcinomatosis in Breast Cancer. *Breast Care (Basel).* 2010;5(6):401-7.
28. Sprave, T, Verma, V, Forster, R, et al. Randomized phase II trial evaluating pain response in patients with spinal metastases following stereotactic body radiotherapy versus three-dimensional conformal radiotherapy. *Radiother Oncol.* 2018;128(2):274-82.
29. Sprave, T, Verma, V, Forster, R, et al. Local response and pathologic fractures following stereotactic body radiotherapy versus three-dimensional conformal radiotherapy for spinal metastases - a randomized controlled trial. *BMC Cancer.* 2018;18(1):859.
30. Steenland, E, Leer, JW, van Houwelingen, H, et al. The effect of a single fraction compared to multiple fractions on painful bone metastases: a global analysis of the Dutch Bone Metastasis Study. *Radiother Oncol.* 1999;52(2):101-9.
31. Sze, WM, Shelley, M, Held, I, et al. Palliation of metastatic bone pain: single fraction versus multifraction radiotherapy - a systematic review of the randomised trials. *Cochrane Database Syst Rev.* 2004(2):CD004721.
32. van der Linden, YM, Steenland, E, van Houwelingen, HC, et al. Patients with a favourable prognosis are equally palliated with single and multiple fraction radiotherapy: results on survival in the Dutch Bone Metastasis Study. *Radiother Oncol.* 2006;78(3):245-53.
33. Wu, JS, Wong, R, Johnston, M, et al. Meta-analysis of dose-fractionation radiotherapy trials for the palliation of painful bone metastases. *Int J Radiat Oncol Biol Phys.* 2003;55(3):594-605.

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Breast Cancer

General Information

Commonly Used Modalities

Internal Radiation Therapy (Brachytherapy)

External Beam Radiation Therapy

- 2D and 3D conformal
- Intensity Modulated Radiation Therapy (IMRT)

Radiation Oncology Considerations

General Considerations

Whole breast irradiation (WBI) is a well-established and integral component of breast conservation therapy (BCT). When given after lumpectomy, WBI has been shown to result in equivalent survival when compared to mastectomy. When compared to lumpectomy alone, the addition of radiation therapy significantly reduces the risk of local recurrence and has even been shown to improve overall survival in some patients. Conventionally fractionated WBI usually consists of treatment to doses of 45 to 50 Gy in daily doses of 1.8-2 Gy. Additional “boost” treatment to the tumor bed has been shown to further decrease the risk of local recurrence in several randomized trials, especially in younger women and those with high-grade lesions.

Adjuvant radiotherapy is an important component of treatment for ductal carcinoma in situ (DCIS). Several large randomized controlled clinical trials have demonstrated the benefit of postoperative radiotherapy after excision of DCIS. These have shown a reduction in overall local recurrences and have also shown a decrease in the proportion of recurrences which are invasive. Except where otherwise noted, guidelines for breast cancer radiotherapy will also apply to patients with DCIS.

In patients treated with mastectomy for invasive breast cancer, adjuvant radiation therapy has been shown to benefit patients with high-risk pathologic features including tumors greater than 5 cm, positive lymph nodes and when the surgical margin is positive. Radiotherapy may also be considered in patients with a constellation of high-risk features including but not limited to tumor greater than 2 cm, extensive lymphovascular invasion and close surgical margins.

Treatment Planning

For external beam WBI, 3D conformal planning techniques are commonly used to achieve a uniform dose distribution throughout the breast. Reasonable cosmesis can be achieved and toxicity can be limited using standard wedges, electronic compensation or forward planned field-in-field segments with custom blocking. Several randomized trials of “simple IMRT” for early stage breast cancer have been reported and have shown a decrease in moist desquamation, overall cosmesis and telangiectasia when compared to 2D conventionally wedged techniques. Of note, both of these studies employed field-in-field techniques to achieve homogeneity which do not meet the CPT definition for IMRT planning and delivery.

There is evidence that radiation dose to the heart contributes to late cardiac toxicity in patients with left sided breast cancer. Gagliardi et al. have developed dose response model to predict the risk of cardiac mortality using data sets from several trials of radiotherapy for both Hodgkin’s disease and breast cancer. They predict that using the most conservative model, when the volume of heart receiving 25 Gy is less than 10% that the risk cardiac mortality from radiation is < 1% at 15 years. Whenever possible, care should be taken to exclude the heart from the primary radiation beam. Cardiac exposure can be limited through alternate patient positioning (such as the prone position) or through the use of deep inspiration breath hold technique. Limitations that would require inverse-planned IMRT or volumetric arc therapy should be rare. IMRT may be of benefit in highly selected cases where the anatomy is unfavorable or the targets closely approximate the heart, however, the use of this technology has not demonstrated a significant clinical advantage in routine cases.

Radiation to the high axilla and supraclavicular region should be considered in cases where there are involved axillary lymph nodes. Treatment of the internal mammary node chain should be considered when those nodes are pathologically enlarged and/or PET avid on imaging studies. Inclusion of the internal mammary nodes in the treatment field may also be indicated when there are four or more positive axillary nodes or when the primary tumor is located in the medial portion of the breast.

Accelerated Whole Breast Irradiation (AWBI)

There is a growing body of evidence that selected women with early stage breast cancer and favorable anatomy are suitable candidates for accelerated whole breast irradiation (AWBI). This approach has been studied in several randomized prospective clinical trials as well as a large meta-analysis. Included patients were mostly age 50 or greater, had tumors less than 4 cm, frequently did not receive chemotherapy, were generally node-negative and had a chest wall separation of < 25 cm. Patients were randomized to receive either 40-42.5 Gy in 15-16 fractions or standard radiation consisting of 50 Gy in 25 fractions. With a median follow-up of 10-12 years, there were no significant differences seen in local control, disease-free survival or overall survival. The most recent report from the UK START trials as well as the meta-analysis have demonstrated that some hypofractionated regimens yielded improved cosmetic outcome including reduced incidence of breast shrinkage, telangiectasias and breast edema in the AWBI patients compared to standard fractionation. Additional benefits of AWBI include a decrease in the number of visits for daily treatment and a reduction in the overall cost of care. These results have prompted recommendations that AWBI should be favored for the endorsed cohort and considered for other selected patients. There is evidence that administration of concurrent trastuzumab increases the risk of left ventricular dysfunction and it is unknown if this effect is more pronounced in patients treated with AWBI. For patients treated with prior chemotherapy, higher acute toxicity has been documented only in individuals whose radiotherapy began less than 20 days after chemotherapy was completed. In 2013, the American Society for Radiation Oncology (ASTRO) included AWBI as one of its featured recommendations as part of the 2013 Choosing Wisely campaign. ASTRO recently published updated consensus criteria for who should be treated with AWBI to include all age groups, any stage as long as a separate nodal field is not used, and patients who have received chemotherapy. The dose inhomogeneity exclusion has also been restated to indicate that the volume of breast tissue receiving > 105% should be minimized regardless of dose-fractionation.

Accelerated Partial Breast Irradiation (APBI)

Although the randomized clinical trials supporting radiotherapy have relied on whole breast irradiation, the majority of the benefit came from reducing recurrence in and immediately adjacent to the lumpectomy site. This observation has prompted investigation of whether local radiation, delivered only to the tumor bed and immediately adjacent tissue, could achieve similar results in selected patients. Accelerated partial breast irradiation (APBI) describes the treatment of the tumor bed alone with an accelerated treatment delivery schedule. Treatment can be given with brachytherapy delivered via implanted single or multilumen catheters, with external beam radiotherapy, or with intraoperative radiotherapy given at the time of surgery.

A large cohort of patients who received APBI using the MammoSite applicator has been studied, and the 5-year actuarial rate of ipsilateral breast tumor recurrence was 3.8%. More than 90% of patients in this study reported good to excellent cosmesis. Long term high-quality data for APBI is currently lacking. Results from the prospective, randomized, phase III NSABP B-39/RTOG 0413 trial were recently reported. The study randomized patients to WBI or APBI delivered via brachytherapy or with 3D conformal techniques. The primary outcome was ipsilateral breast-tumor recurrence. With a median follow-up of 10.2 years, ipsilateral breast-tumor recurrence was 3% in the WBI group vs 4% for APBI. Survival and toxicities were similar. Although APBI did not meet the statistical criteria for equivalence to WBI and the overall difference in recurrence rate was 1%, the authors concluded that APBI might be an acceptable alternative for some women. In the RAPID trial comparing WBI with 3D conformal APBI, Canadian investigators found that 17% of WBI patients vs 29% of 3D conformal APBI patients had adverse cosmetic outcomes. In contrast, fewer adverse events were reported from women treated with lower dose and partial breast irradiation compared to whole breast irradiation in a longitudinal analysis of the IMPORT LOW phase III randomized controlled trial.

Intraoperative radiotherapy (IORT) is a form of APBI in which the entire partial breast treatment is delivered at the time of lumpectomy. Several systems have been approved to deliver treatment with either electrons or 50 kV x-rays. Two large randomized trials of this approach have been published. The ELIOT trial compared electron-based IORT to WBI in women 48 years or older and tumors less than 2.5 cm. For all patients, the ipsilateral breast tumor recurrence rate was 4.4% for the IORT patients vs 0.4% for the WBI patients ($P < .0001$). A

subsequent subset analysis looking only at patients who qualify as “suitable” for APBI using the ASTRO criteria revealed more favorable recurrence rates of 1.5% with electron IORT. Results of the TARGIT-A trial were recently updated and with a shorter median follow-up of 29 months, they reported a local recurrence rate of 3.3% for IORT vs 1.3% for WBI. When only the patients treated at the time of lumpectomy are considered, the local recurrence rates were 2.1% for IORT vs 1.1% for WBI. In these patients, if high-risk features such as positive margins, extensive intraductal component, lobular histology, high-grade histology, lymphovascular invasion or positive nodes were present on the final pathology, WBI was often added to the treatment. Survival was similar in both arms.

It is recommended that individuals considering APBI as an alternative to whole breast irradiation be counseled that whole breast irradiation is the more well-established treatment with documented long-term effectiveness and safety, and that treatment with APBI may be associated with an increased risk of local recurrence and need for mastectomy. Society recommendations regarding patient suitability have been published, but are not all in agreement.

Regarding electronic brachytherapy, the American Brachytherapy Society states that “it is not recommended that electronic brachytherapy be utilized for accelerated partial breast irradiation, non-melanomatous skin cancers, or vaginal cuff brachytherapy outside prospective clinical trials at this time.”

Society Recommendations for AWBI

ASTRO – An update to the 2011 Guideline was published in early 2018. The new recommendations support the use of AWBI for all ages, all stages when nodes will not be treated separately, and in patients who have received any type chemotherapy. The consensus was that when a boost is not given, a dose of 40 Gy in 15 fractions or 42.5 Gy in 16 fractions is favored. In homogeneity greater than 107% in the central axis is no longer an exclusion. The panel recommended that the volume of tissue receiving >105% should be minimized irrespective of dose schedule.

Society Recommendations for APBI

The National Comprehensive Cancer Network® (NCCN, 2020) - Guideline indicates that preliminary studies have shown that APBI may result in similar rates of local control in early breast cancer compared to WBI. They also note that cosmesis may be inferior and follow-up is limited. NCCN recommends treatment with APBI to be provided in a prospective clinical trial when possible. If APBI is provided off trial, then brachytherapy is recommended for those with a low risk of recurrence. They cite the ASTRO criteria for suitable candidates for APBI.

ASTRO - An update to the Evidence-Based Consensus statement was published in 2017. There were several changes in the criteria for who are “suitable” candidates for APBI. The age for the suitable group was lowered to 50 or older. The criteria were also broadened to include ductal carcinoma in situ (DCIS). The criteria are summarized below:

- Age > 50 years
- Surgical margins > 2 mm for invasive ductal cancer and > 3 mm for DCIS
- Size < 2 cm for invasive ductal cancer and < 2.5 cm for DCIS
- DCIS must be low to intermediate grade and non-palpable
- No lymphovascular invasion
- ER positive
- No invasive lobular cancer

American College of Breast Surgeons - The American Society of Breast Surgeons recommends the following selection criteria when considering patients for treatment with APBI, as a sole form of radiation therapy in lieu of whole breast irradiation:

- Age 45 years old or older for invasive cancer and age 50 years or older for DCIS
- Invasive carcinoma or ductal carcinoma in situ

- Total tumor size (invasive and DCIS) less than or equal to 3 cm in size
- Negative microscopic surgical margins of excision
- Sentinel lymph node negative

Clinical Indications

2D or 3D Conformal is appropriate for breast cancer when ANY one of the following conditions are met:

- As an adjunct to surgical treatment after lumpectomy for localized breast cancer or DCIS
- As an adjunct to surgical treatment after mastectomy for locally advanced breast cancer
- To treat recurrent disease
- Palliative treatment of metastatic disease, including symptomatic breast or chest wall disease

Intensity Modulated Radiation Therapy (IMRT) is appropriate for breast cancer when ANY one of the following conditions are met:

- For individuals with left-sided breast lesions where the risk of cardiac exposure would be excessive with 3D conformal treatment and **when ALL of the following are met:**
 - 3D planning has been done, with appropriate techniques to limit toxicity
 - Despite the use of all appropriate techniques, the dose-volume constraints would lead to unacceptable risk of cardiac toxicity such that greater than 10% of the heart would receive 25 Gy or more ($V_{25} > 10\%$)
 - IMRT plan demonstrates a reduction in the volume of heart receiving 25 Gy by at least 20% when compared to the 3D plan
- For individuals who will receive internal mammary node irradiation based on **any one of the following:**
 - Pathologically enlarged (as reported based on imaging technique utilized) internal mammary lymph node(s) by CT, MRI, PET/CT, or CXR
 - Pathologically involved internal mammary lymph node(s) (based on aspiration cytology or tissue biopsy pathology)
 - For individuals at high risk of internal mammary lymph node involvement based on **any one of the following:**
 - Four or more positive axillary lymph nodes
 - Medial quadrant tumor with at least one positive axillary lymph node
 - Medial quadrant T3 tumor
- For individuals where the 3D conformal plan results in hot spots ($> 2 \text{ cm}^3$) receiving more than to 110% of the prescription dose despite the use of forward planned field-in-field blocking and/or mixed beam energy (6 MV and 10 MV/15 MV)
- To treat a previously irradiated field

Note: "Forward planning IMRT" is a term used to describe field-in-field 3D conformal radiation therapy, and should not be reviewed under IMRT constraints.

Brachytherapy is appropriate for breast cancer only when used to deliver ANY one of the following:

- **Intraoperative radiation therapy (IORT)** is appropriate only for individuals who meet **all of the following** criteria:
 - Age 50 or greater
 - Tumor less than or equal to 3 cm with grossly uninvolved surgical margins

- Lymph nodes are grossly negative and negative on intraoperative frozen section if performed
- Distance between the edge of the applicator and the skin will be at least 6 mm

Note: If intraoperative radiotherapy was used at the time of surgery but the final pathologic evaluation reveals indications for whole breast irradiation, the IORT will be considered the boost portion of the treatment.

- **Accelerated partial breast irradiation (APBI)** is appropriate only for individuals who meet **all of the following** criteria:
 - Age 45 or greater for invasive disease or greater than 50 for DCIS
 - Tumor less than or equal to 3 cm with pathologically negative surgical margins
 - Lymph nodes are negative or show only immunohistochemical involvement, N0 or N0(i+)
 - Distance between the edge of the applicator and the skin is at least 6 mm

Note: Electronic brachytherapy is considered not medically necessary.

Hyperthermia is appropriate for breast cancer when the following condition is met:

- For individuals with a chest wall recurrence after prior radiation therapy to the chest or breast.

Fractionation

Whole breast irradiation (WBI) – 17 to 28 fractions of WBI are appropriate only for individuals who meet ANY one of the following criteria:

- Lymph node involvement requiring treatment the supraclavicular or internal mammary nodal regions.
- Mastectomy or breast reconstruction have been performed
- Treatment will be delivered with 3D conformal radiotherapy and the treatment plan results in dose inhomogeneity of greater than 7% in the central axis (for example, if the plan is normalized to 95%, the maximum dose is greater than 112%)
- Concurrent chemotherapy will be administered (does not include trastuzumab or endocrine therapy)

For individuals not meeting one of these criteria, up to 16 fractions of WBI are medically necessary

Breast boost irradiation

- An additional boost of up to 8 fractions is appropriate when the individual has fulfilled the above criteria for 17-28 fractions of WBI.
- For individuals not meeting the above criteria, an additional boost of up to 5 fractions is appropriate.

More than 36 fractions, including whole breast irradiation and boost irradiation, are not medically necessary.

Accelerated partial breast irradiation (APBI) delivered with up to 10 fractions delivered twice daily. More than 10 fractions are not medically necessary.

Intraoperative radiation therapy (IORT) is given as a single fraction. More than one fraction is not medically necessary.

Codes

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The following code list is not meant to be all-inclusive. Authorization requirements will vary by health plan. Please consult the applicable health plan for guidance on specific procedure codes.

Specific CPT codes for services should be used when available. Nonspecific or not otherwise classified codes may be subject to additional documentation requirements and review.

2D and 3D Conformal

CPT/HCPCS

77295	3-dimensional radiotherapy plan, including dose-volume histograms (3D Conformal treatment plan)
77402	Radiation treatment delivery, >1 MeV; simple.
77407	Radiation treatment delivery, > 1 MeV; intermediate.
77412	Radiation treatment delivery, > 1 MeV; complex.
G6003	Radiation treatment delivery, single treatment area, single port or parallel opposed ports, simple blocks or no blocks: up to 5 MeV
G6004	Radiation treatment delivery, single treatment area, single port or parallel opposed ports, simple blocks or no blocks: 6-10 MeV
G6005	Radiation treatment delivery, single treatment area, single port or parallel opposed ports, simple blocks or no blocks: 11-19 MeV
G6006	Radiation treatment delivery, single treatment area, single port or parallel opposed ports, simple blocks or no blocks: 20 MeV or greater
G6007	Radiation treatment delivery, 2 separate treatment areas, 3 or more ports on a single treatment area, use of multiple blocks: up to 5 MeV
G6008	Radiation treatment delivery, 2 separate treatment areas, 3 or more ports on a single treatment area, use of multiple blocks: 6-10 MeV
G6009	Radiation treatment delivery, 2 separate treatment areas, 3 or more ports on a single treatment area, use of multiple blocks: 11-19 MeV
G6010	Radiation treatment delivery, 2 separate treatment areas, 3 or more ports on a single treatment area, use of multiple blocks: 20 MeV or greater
G6011	Radiation treatment delivery, 3 or more separate treatment areas, custom blocking, tangential ports, wedges, rotational beam, compensators, electron beam; up to 5 MeV
G6012	Radiation treatment delivery, 3 or more separate treatment areas, custom blocking, tangential ports, wedges, rotational beam, compensators, electron beam; 6-10 MeV
G6013	Radiation treatment delivery, 3 or more separate treatment areas, custom blocking, tangential ports, wedges, rotational beam, compensators, electron beam; 11-19 MeV
G6014	Radiation treatment delivery, 3 or more separate treatment areas, custom blocking, tangential ports, wedges, rotational beam, compensators, electron beam; 20 MeV or greater

Intensity Modulated Radiation Therapy

CPT/HCPCS

77301	Intensity modulated radiation therapy plan, including dose volume histogram for target and critical structure partial tolerance specifications (IMRT treatment plan)
77338	Multi-leaf collimator (MLC) device(s) for intensity modulated radiation therapy (IMRT), design and construction per IMRT plan
77385	Intensity modulated radiation treatment delivery (IMRT), includes guidance and tracking when performed; Simple (includes breast cancer, prostate cancer and compensator-based IMRT)
G6015	Intensity modulated Treatment delivery, single or multiple fields/arcs, via narrow spatially and temporally modulated beams, binary, dynamic MLC, per treatment session
G6016	Compensator-based beam modulation treatment delivery of inverse planned treatment using 3 or more high resolution (milled or cast) compensator convergent beam modulated fields, per treatment session

Brachytherapy

CPT/HCPCS

19296	Placement of radiotherapy afterloading expandable catheter (single or multichannel) into the breast for interstitial radioelement application following partial mastectomy, includes image guidance
19297	Placement of radiotherapy afterloading expandable catheter (single or multichannel) into the breast for interstitial radioelement application following partial mastectomy, includes image guidance
19298	Placement of radiotherapy afterloading brachytherapy catheters (multiple tube and button type) into the breast for interstitial radioelement application following partial mastectomy, includes image guidance
77295	3-dimensional radiotherapy plan, including dose-volume histograms (3D conformal treatment plan)
77316	Brachytherapy isodose plan; simple (1-4 sources or 1 channel), includes basic dosimetry calculations (Do not bill 77300)
77317	Brachytherapy isodose plan; intermediate (5-10 sources or 2-12 channels), includes basic dosimetry calculation (Do not bill 77300)
77318	Brachytherapy isodose plan; complex (over 10 sources or over 12 channels), includes basic dosimetry calculations (Do not bill 77300)
77370	Special medical radiation physics consultation
77470	Special treatment procedure
77770	Remote afterloading high dose rate radionuclide interstitial or intracavitary brachytherapy, includes basic dosimetry, when performed; 1 channel
77771	Remote afterloading high dose rate radionuclide interstitial or intracavitary brachytherapy, includes basic dosimetry, when performed; 2-12 channels
77772	Remote afterloading high dose rate radionuclide interstitial or intracavitary brachytherapy, includes basic dosimetry, when performed; over 12 channels
77778	Interstitial radiation source application; complex, includes supervision, handling, loading of radiation source, when performed
0394T	HDR electronic brachytherapy, skin surface application, per fraction
0395T	HDR electronic brachytherapy, interstitial or intracavitary treatment, per fraction

Intraoperative Radiation Therapy

CPT/HCPCS

77424	Intraoperative radiation treatment delivery, x-ray, single treatment session
77425	Intraoperative radiation treatment delivery, electrons, single treatment session
77469	Intraoperative radiation treatment management
19294	Preparation of tumor cavity, with placement of a radiation therapy applicator for intraoperative radiation therapy (IORT) concurrent with partial mastectomy (List separately in addition to code for primary procedure)

Hyperthermia

CPT/HCPCS

77600	Hyperthermia, external generated; superficial
77605	Hyperthermia, external generated; deep
77610	Hyperthermia, interstitial probe(s); 5 or fewer interstitial applicators
77615	Hyperthermia, interstitial probes; more than 5 interstitial applicators
77620	Hyperthermia generated by intracavitary probe(s)

All Modalities

ICD-10 Diagnoses

C50.011-C50.929	Malignant neoplasm of the breast
C79.81	Secondary malignant neoplasm of the breast
D05.00 - D05.92	Carcinoma in-situ of the breast

References

1. American Society for Radiation Oncology (ASTRO). ASTRO model policies: intensity modulated radiation therapy (IMRT). ([Updated 06-06-2019]) [18 p.]. Available from: <https://www.astro.org/Daily-Practice/Reimbursement/Model-Policies>.

2. American Society for Radiation Oncology (ASTRO)[Internet]. Ten things physicians and patients should question Released September 23, 2013 (1-5) and September 15, 2014 (6-10) [Updated June 21, 2016 and June 9, 2017] [#1 updated June 18, 2018] [Last reviewed 2019] [cited 2020 Feb 24]. Available from: <https://www.choosingwisely.org/societies/american-society-for-radiation-oncology/>.
3. American Society of Breast Surgeons (ASBrS). Official statement: consensus guideline on accelerated partial breast irradiation. (June 5, 2018) [6 p.]. Available from: <https://www.breastsurgeons.org/resources/statements>.
4. Bartelink, H, Maingon, P, Poortmans, P, et al. Whole-breast irradiation with or without a boost for patients treated with breast-conserving surgery for early breast cancer: 20-year follow-up of a randomised phase 3 trial. *Lancet Oncol*. 2015;16(1):47-56.
5. Belkacemi, Y, Gligorov, J, Ozsahin, M, et al. Concurrent trastuzumab with adjuvant radiotherapy in HER2-positive breast cancer patients: acute toxicity analyses from the French multicentric study. *Ann Oncol*. 2008;19(6):1110-6.
6. Bhattacharya, IS, Haviland, JS, Kirby, AM, et al. Patient-reported outcomes over 5 years after whole- or partial-breast radiotherapy: longitudinal analysis of the IMPORT LOW (CRUK/06/003) phase III randomized controlled trial. *J Clin Oncol*. 2019;37(4):305-17.
7. Cao, L, Cai, G, Chang, C, et al. Diastolic Dysfunction Occurs Early in HER2-Positive Breast Cancer Patients Treated Concurrently With Radiation Therapy and Trastuzumab. *Oncologist*. 2015;20(6):605-14.
8. Chan, EK, Woods, R, Virani, S, et al. Long-term mortality from cardiac causes after adjuvant hypofractionated vs. conventional radiotherapy for localized left-sided breast cancer. *Radiother Oncol*. 2015;114(1):73-8.
9. Correa, C, Harris, EE, Leonardi, MC, et al. Accelerated partial breast irradiation: executive summary for the update of an ASTRO evidence-based consensus statement. *Pract Radiat Oncol*. 2017;7(2):73-9.
10. Early Breast Cancer Trialists' Collaborative (EBCTCG), McGale, P, Taylor, C, et al. Effect of radiotherapy after mastectomy and axillary surgery on 10-year recurrence and 20-year breast cancer mortality: meta-analysis of individual patient data for 8135 women in 22 randomised trials. *Lancet*. 2014;383(9935):2127-35.
11. Early Breast Cancer Trialists' Collaborative, G, Darby, S, McGale, P, et al. Effect of radiotherapy after breast-conserving surgery on 10-year recurrence and 15-year breast cancer death: meta-analysis of individual patient data for 10,801 women in 17 randomised trials. *Lancet*. 2011;378(9804):1707-16.
12. Fisher, B, Anderson, S, Bryant, J, et al. Twenty-year follow-up of a randomized trial comparing total mastectomy, lumpectomy, and lumpectomy plus irradiation for the treatment of invasive breast cancer. *N Engl J Med*. 2002;347(16):1233-41.
13. Fisher, B, Costantino, J, Redmond, C, et al. Lumpectomy compared with lumpectomy and radiation therapy for the treatment of intraductal breast cancer. *N Engl J Med*. 1993;328(22):1581-6.
14. Fisher, B, Dignam, J, Wolmark, N, et al. Tamoxifen in treatment of intraductal breast cancer: National Surgical Adjuvant Breast and Bowel Project B-24 randomised controlled trial. *Lancet*. 1999;353(9169):1993-2000.
15. Gagliardi, G, Constine, LS, Moiseenko, V, et al. Radiation dose-volume effects in the heart. *Int J Radiat Oncol Biol Phys*. 2010;76(3 Suppl):S77-85.
16. Gagliardi, G, Lax, I, Ottolenghi, A, et al. Long-term cardiac mortality after radiotherapy of breast cancer--application of the relative seriality model. *Br J Radiol*. 1996;69(825):839-46.
17. Garg, PK, Jakhetiya, A, Pandey, R, et al. Adjuvant radiotherapy versus observation following lumpectomy in ductal carcinoma in-situ: a meta-analysis of randomized controlled trials. *Breast J*. 2018;24(3):233-9.
18. Haviland, JS, Owen, JR, Dewar, JA, et al. The UK Standardisation of Breast Radiotherapy (START) trials of radiotherapy hypofractionation for treatment of early breast cancer: 10-year follow-up results of two randomised controlled trials. *Lancet Oncol*. 2013;14(11):1086-94.
19. Hepel, JT, Arthur, D, Shaitelman, S, et al. American Brachytherapy Society consensus report for accelerated partial breast irradiation using interstitial multicatheter brachytherapy. *Brachytherapy*. 2017;16(5):919-28.
20. Hickey, BE, Lehman, M, Francis, DP, et al. Partial breast irradiation for early breast cancer. *Cochrane Database Syst Rev*. 2016;7:CD007077.
21. Huang, O, Wang, L, Shen, K, et al. Breast cancer subpopulation with high risk of internal mammary lymph nodes metastasis: analysis of 2,269 Chinese breast cancer patients treated with extended radical mastectomy. *Breast Cancer Res Treat*. 2008;107(3):379-87.
22. James, ML, Lehman, M, Hider, PN, et al. Fraction size in radiation treatment for breast conservation in early breast cancer. *Cochrane Database Syst Rev*. 2010(11):CD003860.
23. Landau, D, Adams, EJ, Webb, S, et al. Cardiac avoidance in breast radiotherapy: a comparison of simple shielding techniques with intensity-modulated radiotherapy. *Radiother Oncol*. 2001;60(3):247-55.
24. Leonardi, MC, Maisonneuve, P, Mastropasqua, MG, et al. How do the ASTRO consensus statement guidelines for the application of accelerated partial breast irradiation fit intraoperative radiotherapy? A retrospective analysis of patients treated at the European Institute of Oncology. *Int J Radiat Oncol Biol Phys*. 2012;83(3):806-13.
25. Lohr, F, El-Haddad, M, Dobler, B, et al. Potential effect of robust and simple IMRT approach for left-sided breast cancer on cardiac mortality. *Int J Radiat Oncol Biol Phys*. 2009;74(1):73-80.
26. Mukesh, MB, Barnett, GC, Wilkinson, JS, et al. Randomized controlled trial of intensity-modulated radiotherapy for early breast cancer: 5-year results confirm superior overall cosmesis. *J Clin Oncol*. 2013;31(36):4488-95.

27. NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines®) for Breast Cancer (Version 4.2020). Available at <http://www.nccn.org>. ©National Comprehensive Cancer Network, 2020.
28. Peterson, D, Truong, PT, Parpia, S, et al. Predictors of adverse cosmetic outcome in the RAPID trial: an exploratory analysis. *Int J Radiat Oncol Biol Phys*. 2015;91(5):968-76.
29. Pignol, JP, Olivotto, I, Rakovitch, E, et al. A multicenter randomized trial of breast intensity-modulated radiation therapy to reduce acute radiation dermatitis. *J Clin Oncol*. 2008;26(13):2085-92.
30. Polgar, C, Ott, OJ, Hildebrandt, G, et al. Late side-effects and cosmetic results of accelerated partial breast irradiation with interstitial brachytherapy versus whole-breast irradiation after breast-conserving surgery for low-risk invasive and in-situ carcinoma of the female breast: 5-year results of a randomised, controlled, phase 3 trial. *Lancet Oncol*. 2017;18(2):259-68.
31. Polgar, C, Van Limbergen, E, Potter, R, et al. Patient selection for accelerated partial-breast irradiation (APBI) after breast-conserving surgery: recommendations of the Groupe Européen de Curietherapie-European Society for Therapeutic Radiology and Oncology (GEC-ESTRO) breast cancer working group based on clinical evidence (2009). *Radiother Oncol*. 2010;94(3):264-73.
32. Shah, C, Badiyan, S, Ben Wilkinson, J, et al. Treatment efficacy with accelerated partial breast irradiation (APBI): final analysis of the American Society of Breast Surgeons MammoSite(R) breast brachytherapy registry trial. *Ann Surg Oncol*. 2013;20(10):3279-85.
33. Shah, C, Vicini, F, Shaitelman, SF, et al. The American Brachytherapy Society consensus statement for accelerated partial-breast irradiation. *Brachytherapy*. 2018;17(1):154-70.
34. Silverstein, MJ, Fastner, G, Maluta, S, et al. Intraoperative radiation therapy: a critical analysis of the ELIOT and TARGIT trials. Part 1--ELIOT. *Ann Surg Oncol*. 2014;21(12):3787-92.
35. Smith, BD, Bellon, JR, Blitzblau, R, et al. Radiation therapy for the whole breast: Executive summary of an American Society for Radiation Oncology (ASTRO) evidence-based guideline. *Pract Radiat Oncol*. 2018;8(3):145-52.
36. Tom, MC, Hepel, JT, Patel, R, et al. The American Brachytherapy Society consensus statement for electronic brachytherapy. *Brachytherapy*. 2019;18(3):292-8.
37. Vaidya, JS, Wenz, F, Bulsara, M, et al. Risk-adapted targeted intraoperative radiotherapy versus whole-breast radiotherapy for breast cancer: 5-year results for local control and overall survival from the TARGIT-A randomised trial. *Lancet*. 2014;383(9917):603-13.
38. Veronesi, U, Orecchia, R, Maisonneuve, P, et al. Intraoperative radiotherapy versus external radiotherapy for early breast cancer (ELIOT): a randomised controlled equivalence trial. *Lancet Oncol*. 2013;14(13):1269-77.
39. Vicini, FA, Cecchini, RS, White, JR, et al. Long-term primary results of accelerated partial breast irradiation after breast-conserving surgery for early-stage breast cancer: a randomised, phase 3, equivalence trial. *Lancet*. 2019;394(10215):2155-64.
40. Wang, W, Purdie, TG, Rahman, M, et al. Rapid automated treatment planning process to select breast cancer patients for active breathing control to achieve cardiac dose reduction. *Int J Radiat Oncol Biol Phys*. 2012;82(1):386-93.
41. Whelan, TJ, Pignol, JP, Levine, MN, et al. Long-term results of hypofractionated radiation therapy for breast cancer. *N Engl J Med*. 2010;362(6):513-20.
42. Zygogianni, A, Kouloulis, V, Antypas, C, et al. The impact of intermediate time between chemotherapy and hypofractionated radiotherapy to the radiation induced skin toxicity for breast adjuvant treatment. *Breast J*. 2014;20(1):74-8.

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Central Nervous System Cancers: Intracranial, Spinal, Ocular, and Neurologic Indications

General Information

Commonly Used Modalities

Internal Radiation Therapy (Brachytherapy)

External Beam Radiation Therapy

- 2D and 3D conformal
- Intensity Modulated Radiation Therapy (IMRT)
- Stereotactic Body Radiation Therapy (SBRT)
- Stereotactic Radiosurgery (SRS)

Proton Beam Therapy – see separate guideline

Radiation Oncology Considerations

Brain metastasis is the most common CNS malignancy. Patients with brain metastasis have a poor prognosis, with a median survival of 2 to 3 months when treated with steroids alone. The addition of whole brain radiation therapy (WBRT) generally extends median survival to 3 to 6 months. Individual results vary significantly based on the number of metastatic lesions, the performance status of the patient and the extent of extracranial disease. In recent years, there has been a trend away from the use of WBRT in patients with limited disease who are candidates for surgery or radiosurgery in order to minimize the neurocognitive complications of WBRT. Whole brain radiation therapy with standard 2D or 3D conformal radiation therapy is recommended for individuals with multiple brain metastases (greater than 4 treated in a given session), and should also be considered in individuals with brain metastases and any of the following: ECOG performance status greater than 2, presence of progressive and symptomatic visceral disease, or metastases significantly progressing after multiple treatment options. The RTOG has studied several different fractionation schedules for WBRT and prolonged fractionation schedules did not improve outcomes compared to 30 Gy in 10 fractions.

A 2019 evidence-based review by the Congress of Neurological Surgeons on the role of whole brain radiotherapy recommends a dose of 30 Gy in 10 fractions to improve progression-free survival in patients with more than four metastases.

To minimize the neurocognitive toxicity, local therapy in the form of surgery or stereotactic radiosurgery is recommended for patients with four or fewer accessible lesions. When WBRT is used, 6 months of memantine therapy should be offered to potentially delay, lessen or prevent the associated neurologic toxicity. Results from the phase III NRG CC001 trial have recently been reported. There were 518 patients randomized to either hippocampal avoidance (HA-WBRT) or whole brain radiation therapy (WBRT). Both groups were treated with memantine. The HA-WBRT treated patients were found to have a lower risk of cognitive failure compared to standard WBRT (HR 0.74, $P = .02$) attributable to preservation of executive function, learning, and memory. There were no differences in OS, intracranial PFS or toxicity.

Historically, surgical resection has been performed in patients with solitary metastasis in accessible locations. Postoperative WBRT has been shown to reduce the risk of recurrence in a randomized trial. For brain metastases greater than 4 cm in diameter or causing mass effect, surgery is preferred over stereotactic radiosurgery.

External beam radiation treatment is a common treatment for primary brain tumors as either definitive or adjuvant therapy after resection. For high-grade gliomas, concurrent temozolomide chemotherapy is generally recommended as it has been shown to increase survival compared to radiotherapy alone. In 2016, ASTRO published an evidence-based clinical practice guideline on radiation therapy for glioblastoma. For patients with reasonable performance status up to age 70, a dose of 60 Gy in 30 fractions should be given. For elderly

patients, hypofractionated treatment such as 40 Gy in 15 fractions gives similar results. IMRT may provide better coverage for primary brain lesions, with decreased exposure of normal brain tissue. IMRT is recommended when a lesion is in close proximity to a critical or sensitive structure and 3D conformal radiation would result in unsafe exposure to these structures. The use of IMRT for hippocampal sparing is under active investigation and should only be used in the context of a clinical trial. IMRT is considered medically necessary in any case of repeat irradiation of overlapping or bordering treatment fields.

SRS has an excellent safety profile for many clinical situations when targets are localized, and it has applications for both benign and malignant lesions. It also often represents an alternative to surgical intervention when patients are not optimal surgical candidates. SRS has been extensively studied in the treatment of limited brain metastases. Control rates of approximately 90% are reported. Although recurrence elsewhere in the brain is common, the addition of WBRT to SRS does not improve survival. This has led to the ASTRO Choosing Wisely recommendation not to routinely add WBRT to SRS for limited brain metastasis. SRS is not recommended for the treatment of CNS lymphoma.

Stereotactic boost for high-grade gliomas has been studied in several randomized controlled clinical trials. RTOG 93-05 randomized patients with glioblastoma multiforme to upfront SRS followed by conventional radiotherapy and carmustine to the same treatment without SRS. With a median follow-up of 61 months, there was no difference in survival, pattern of failure or quality of life in the two groups. RTOG 0023 studied the use of a stereotactic conformal boost for supratentorial glioblastoma multiforme. In this study, four weekly stereotactic boost treatments were delivered to give a cumulative dose of 70-78 Gy to the postoperative enhancing tumor. There was no difference in survival compared to historical controls. Based on these studies, SRS or SBRT are considered investigational for the primary treatment of grade 3-4 gliomas.

For certain benign CNS abnormalities, SRS has been shown to be a safe and effective treatment. Soon after the development of the Gamma Knife by Leksell in the 1970s, it was studied for the treatment of arteriovenous malformations (AVM) where it has been shown to have an 80% obliteration rate. Based on this proof of concept, SRS has subsequently been shown to be an effective alternative to surgery for a wide variety of benign lesions including ocular melanoma, retinoblastoma, schwannoma, craniopharyngioma, pineal lesions and pituitary adenoma. SRS for the treatment of trigeminal neuralgia is medically necessary in cases refractory to medical management. SRS for the treatment of epilepsy, Parkinson's disease and other movement disorders is listed as "insufficient evidence" in an evidence-based review by the American Academy of Neurology and therefore remains investigational at this time.

SRS is given as a single fraction. Cranial stereotactic treatment given in 2-5 fractions is billed as SBRT.

For metastatic lesions outside the brain, please refer to specific guidelines for the appropriate location (e.g., Lung Cancer for lung metastases).

Clinical Indications

2D or 3D Conformal is appropriate for CNS cancers when ANY of the following conditions are met:

- Primary cranial, spinal, and ocular lesions
- Metastatic cranial, spinal, and ocular lesions
- Prophylactic cranial irradiation

Intracranial Lesions

Primary Malignant Brain Lesions

High-Grade Gliomas (grade 3-4)

Intensity Modulated Radiation Therapy (IMRT) is appropriate for high-grade gliomas in individuals with good performance status

- ECOG 0, 1, or 2

When **one** of the following conditions is met:

- Treatment is given with curative intent

- To treat a previously irradiated field

Stereotactic Radiosurgery (SRS) is appropriate for high-grade gliomas in individuals with good performance status

- ECOG 0, 1, or 2

When **one** of the following conditions is met:

- Recurrent disease
- To treat a previously irradiated field

Low-Grade Gliomas (grade 1-2)

Intensity Modulated Radiation Therapy (IMRT) is appropriate for low-grade gliomas in individuals with good performance status

- ECOG 0, 1, or 2

When **one** of the following conditions is met:

- Treatment is given with curative intent
- To treat a previously irradiated field

Stereotactic Radiosurgery (SRS) is appropriate for low-grade gliomas in individuals with good performance status

- ECOG 0, 1, or 2

When **one** of the following conditions is met:

- Initial treatment
- Recurrent disease
- To treat a previously irradiated field

Medulloblastoma supratentorial primitive neuroectodermal tumors (PNET) Ependymoma

Intensity Modulated Radiation Therapy (IMRT) is appropriate for medulloblastoma, supratentorial, PNET, ependymoma **when ANY of the following conditions are met:**

- The lesion falls near a critical structure, such as the optic nerve, lens, retina, optic chiasm, cochlea, or brainstem and standard techniques such as 3D conformal radiotherapy would result in significant risk of damage to the critical structure
- In a pediatric patient, age less than 21
- To treat a previously irradiated field

Stereotactic Radiosurgery (SRS) is appropriate for medulloblastoma, supratentorial PNET, ependymoma when the following condition is met:

- Only to treat a previously irradiated field

CNS lymphoma

Intensity Modulated Radiation Therapy (IMRT) is appropriate for CNS lymphoma **when ANY of the following conditions are met:**

- The lesion falls near a critical structure, such as the optic nerve, lens, retina, optic chiasm, cochlea, or brainstem and standard techniques such as 3D conformal radiotherapy would result in significant risk of damage to the critical structure
- To treat a previously irradiated field

Stereotactic Radiosurgery (SRS) is appropriate for CNS lymphoma when the following condition is met:

- Only to treat a previously irradiated field

Metastatic Brain Lesions

Intensity Modulated Radiation Therapy (IMRT) is appropriate for metastatic brain lesions in individuals with good performance status

- ECOG 0, 1, or 2

When **one** of the following conditions is met:

- The lesion falls near a critical structure, such as the optic nerve, lens, retina, optic chiasm, cochlea, or brainstem, and standard techniques such as 3D conformal radiotherapy would result in significant risk of damage to the critical structure
- To deliver hippocampal sparing whole brain radiotherapy
- To treat a previously irradiated field

Stereotactic Radiosurgery (SRS) is appropriate for metastatic brain lesions **when ANY of the following conditions are met:**

- For individuals with good performance status
 - ECOG 0, 1, or 2
- To treat a previously irradiated field

Benign Brain Lesions

Intracranial arteriovenous malformations (AVMs)

Intensity Modulated Radiation Therapy (IMRT) is appropriate for AVMs when the following condition is met:

- Only to treat a previously irradiated field

Stereotactic radiosurgery (SRS) is appropriate for AVMs when the following condition is met:

- For treatment of intracranial arteriovenous malformations

Pituitary adenomas

Intensity Modulated Radiation Therapy (IMRT) is appropriate for pituitary adenomas **when ANY of the following conditions are met:**

- The lesion falls near a critical structure, such as the optic nerve, lens, retina, or optic chiasm, and standard techniques such as 3D conformal radiotherapy would result in significant risk of damage to the critical structure
- To treat a previously irradiated field

Stereotactic radiosurgery (SRS) is appropriate for pituitary adenomas **when ANY of the following conditions are met:**

- When individual is symptomatic
- To treat a previously irradiated field

Meningioma

Intensity Modulated Radiation Therapy (IMRT) is appropriate for meningioma **when ANY of the following conditions are met:**

- The lesion falls near a critical structure, such as the optic nerve, lens, retina, optic chiasm, cochlea, or brainstem, and standard techniques such as 3D conformal radiotherapy would result in significant risk of damage to the critical structure
- To treat a previously irradiated field

Stereotactic radiosurgery (SRS) is appropriate for meningioma **when ANY of the following conditions are met**

- When lesion is unresectable or recurrent, or if there is residual disease following surgery
- To treat a previously irradiated field

Other benign brain tumors: acoustic neuromas, craniopharyngiomas, pineal gland tumors, schwannomas

Intensity Modulated Radiation Therapy (IMRT) is appropriate for other benign brain tumors **when ANY of the following conditions are met:**

- The lesion falls near a critical structure, such as the optic nerve, lens, retina, optic chiasm, cochlea, or brainstem and standard techniques such as 3D conformal radiotherapy would result in significant risk of damage to the critical structure
- To treat a previously irradiated field

Stereotactic radiosurgery (SRS) is appropriate for other benign brain tumors when the following condition is met:

- For treatment of other benign brain tumors, including acoustic neuromas, craniopharyngiomas, pineal gland tumors, schwannomas

Ocular Lesions

Uveal Melanoma

Intensity Modulated Radiation Therapy (IMRT) is appropriate for uveal melanoma when the following condition is met:

- Only to treat a previously irradiated field

Stereotactic Radiosurgery (SRS) is appropriate for uveal melanoma **when ANY of the following conditions are met:**

- For treatment of melanoma of the choroid
- To treat a previously irradiated field

Brachytherapy is appropriate for uveal melanoma **when ALL of the following conditions are met**

- When apical height of the tumor is up to 10.0 mm
- The maximal base diameter is 18.0 mm or less

Retinoblastoma

Intensity Modulated Radiation Therapy (IMRT) is appropriate for retinoblastoma **when ANY of the following conditions are met:**

- In pediatric individuals (age less than 21)
- To treat a previously irradiated field

Brachytherapy is appropriate for retinoblastoma **when ALL the following conditions are met:**

- When apical height of the tumor is up to 10.0 mm
- The maximal base diameter is 18.0 mm or less

Spine Lesions; Primary or Metastatic Lesions of the Spine

Intensity Modulated Radiation Therapy (IMRT) is appropriate for spine lesions when the following condition is met:

- Only to treat a previously irradiated field

Stereotactic Body Radiation therapy (SBRT) is appropriate for spine lesions **when EITHER of the following conditions is met:**

- When other treatment options are not available (**both must be met**)
 - Not amenable to surgical resection (**at least one must apply**)
 - Related to prior surgery, tumor location, or surgical candidacy
 - Surgery alone is not an option
 - When lesions are not amenable to 3D conformal techniques
- To treat a previously irradiated field

Note: When SRS/SBRT is being requested to treat a patient with oligometastatic disease with potentially curative intent, please refer to separate criteria in the Oligometastatic Extracranial Disease section of the Guidelines.

Other Neurologic Conditions; Trigeminal Neuralgia

Intensity Modulated Radiation Therapy (IMRT) is appropriate for trigeminal neuralgia when the following condition is met:

- To treat a previously irradiated field

Stereotactic radiosurgery (SRS) is appropriate for trigeminal neuralgia **when ANY of the following conditions are met:**

- When symptoms are refractory to standard medical management
- To treat a previously irradiated field

Codes

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The following code list is not meant to be all-inclusive. Authorization requirements will vary by health plan. Please consult the applicable health plan for guidance on specific procedure codes.

Specific CPT codes for services should be used when available. Nonspecific or not otherwise classified codes may be subject to additional documentation requirements and review.

3D Conformal

CPT/HCPCS

77295 3-dimensional radiotherapy plan, including dose-volume histograms

ICD-10 Diagnoses

Not specified

Intensity Modulated Radiation Therapy

CPT/HCPCS

77301 Intensity modulated radiotherapy plan, including dose-volume histograms for target and critical structure partial tolerance specifications (Listed once only)

77338 Multi-leaf collimator (MLC) device(s) for intensity modulated radiation therapy (IMRT), design and construction per IMRT plan

77386 Intensity modulated radiation treatment delivery (IMRT), includes guidance and tracking, when performed; complex

G6015 Intensity modulated Treatment delivery, single or multiple fields/arcs, via narrow spatially and temporally modulated beams, binary, dynamic MLC, per treatment session

G6016 Compensator-based beam modulation treatment delivery of inverse planned treatment using 3 or more high resolution (milled or cast) compensator convergent beam modulated fields, per treatment session

ICD-10 Diagnoses

C69.20 - C69.22 ... Retinoblastoma

C69.40 - C69.42 ... Malignant neoplasm uveal tract

C71.0 - C71.9 Malignant neoplasm brain

C79.31 - C79.49 ... Secondary malignant neoplasm brain and spinal cord

C85.81 CNS lymphoma

D33.0 - D33.2 Benign brain lesions

D35.2 Pituitary adenoma

D35.4..... Benign pineal tumor
 G50.0 Trigeminal neuralgia
 Q28.2 Intracranial AVM

Stereotactic Body Radiation Therapy

CPT/HCPCS

61796 Stereotactic radiosurgery (particle beam, gamma ray, or linear accelerator); 1 simple cranial lesion
 61797 Stereotactic radiosurgery (particle beam, gamma ray, or linear accelerator); each additional cranial lesion, simple
 61798 Stereotactic radiosurgery (particle beam, gamma ray, or linear accelerator); 1 complex cranial lesion
 61799 Stereotactic radiosurgery (particle beam, gamma ray, or linear accelerator); each additional cranial lesion, complex
 63620 Stereotactic radiosurgery (particle beam, gamma ray, or linear accelerator); one spinal lesion
 63621 Stereotactic radiosurgery (particle beam, gamma ray, or linear accelerator); each add'l spinal lesion
 77295 3-dimensional radiotherapy plan, including dose-volume histograms
 77301 Intensity modulated radiotherapy plan, including dose-volume histograms for target and critical structure partial tolerance specifications (Listed once only)
 77338 Multi-leaf collimator (MLC) device(s) for intensity modulated radiation therapy (IMRT), design and construction per IMRT plan
 77373 Stereotactic body radiation therapy, treatment delivery, per fraction to 1 or more lesions, including image guidance, entire course not to exceed 5 fractions
 77370 Special medical radiation physics consultation
 77435 Stereotactic body radiation therapy, treatment management, per treatment course, to 1 or more lesions, including image guidance, entire course not to exceed 5 fractions
 77470 Special treatment procedure
 G0339 Image guided robotic linear accelerator-based stereotactic radiosurgery, complete course of therapy in one session or first session of fractionated treatment
 G0340 Image guided robotic linear accelerator-based stereotactic radiosurgery, delivery including collimator changes and custom plugging, fractionated treatment, all lesions, per session, second through fifth sessions, maximum 5 sessions per course of treatment

Stereotactic Radiosurgery

CPT/HCPCS

61796 Stereotactic radiosurgery (particle beam, gamma ray, or linear accelerator); 1 simple cranial lesion
 61797 Stereotactic radiosurgery (particle beam, gamma ray, or linear accelerator); each additional cranial lesion, simple
 61798 Stereotactic radiosurgery (particle beam, gamma ray, or linear accelerator); 1 complex cranial lesion
 61799 Stereotactic radiosurgery (particle beam, gamma ray, or linear accelerator); each additional cranial lesion, complex
 61800 Application of stereotactic headframe for stereotactic radiosurgery
 63620 Stereotactic radiosurgery (particle beam, gamma ray, or linear accelerator); one spinal lesion
 63621 Stereotactic radiosurgery (particle beam, gamma ray, or linear accelerator); each add'l spinal lesion
 77295 3-dimensional radiotherapy plan, including dose-volume histograms
 77301 Intensity modulated radiotherapy plan, including dose-volume histograms for target and critical structure partial tolerance specifications (Listed once only)
 77338 Multi-leaf collimator (MLC) device(s) for intensity modulated radiation therapy (IMRT), design and construction per IMRT plan
 77370 Special medical radiation physics consultation
 77371 Radiation treatment delivery, stereotactic radiosurgery (SRS) complete course of treatment of cranial lesion(s) consisting of 1 session; multi-source Cobalt 60 based
 77372 Radiation treatment delivery, stereotactic radiosurgery (SRS) complete course of treatment of cranial lesion(s) consisting of 1 session; linear accelerator based
 77432 Stereotactic radiation treatment management of cranial lesion(s) (complete course of treatment consisting of 1 session)
 G0339 Image guided robotic linear accelerator-based stereotactic radiosurgery, complete course of therapy in one session or first session of fractionated treatment

G0340 Image guided robotic linear accelerator-based stereotactic radiosurgery, delivery including collimator changes and custom plugging, fractionated treatment, all lesions, per session, second through fifth sessions, maximum 5 sessions per course of treatment

ICD-10 Diagnoses (SBRT/SRS)

C41.2..... Malignant neoplasm vertebral column
 G50.0 Trigeminal neuralgia
 C69.30 - C69.32 ... Melanoma of choroid
 C71.0 - C71.9 Malignant neoplasm of brain
 C79.31 - C79.49 ... Secondary malignant neoplasm brain and spinal cord
 D33.0 - D33.2 Benign brain lesions
 D35.2..... Pituitary adenoma
 D35.4..... Benign pineal tumor
 Q28.2 Intracranial AVM

Brachytherapy

CPT/HCPCS

67218 Destruction of localized lesion of retina (eg, macular edema, tumors), 1 or more sessions; radiation by implantation of source (includes removal of source)
 77295 3-Dimensional radiotherapy plan, including dose-volume histograms \
 77316 Brachytherapy isodose plan; simple (1-4 sources or 1 channel), includes basic dosimetry calculations (Do not bill 77300)
 77317 Brachytherapy isodose plan; intermediate (5-10 sources or 2-12 channels), includes basic dosimetry calculation (Do not bill 77300)
 77318 Brachytherapy isodose plan; complex (over 10 sources or over 12 channels), includes basic dosimetry calculations (Do not bill 77300)
 77370 Special medical radiation physics consultation
 77470 Special treatment procedure
 77778 Interstitial radiation source application, complex, includes supervision, handling, loading of radiation source, when performed
 77790 Supervision, handling, loading of radiation source

ICD-10 Diagnoses

C69.20 - C69.22 ... Retinoblastoma
 C69.40 - C69.42 ... Uveal melanoma

References

1. American Brachytherapy Society - Ophthalmic Oncology Task Force. The American Brachytherapy Society consensus guidelines for plaque brachytherapy of uveal melanoma and retinoblastoma. *Brachytherapy*. 2014;13(1):1-14.
2. American Society for Radiation Oncology (ASTRO). ASTRO model policies: intensity modulated radiation therapy (IMRT). ([Updated 06-06-2019]) [18 p.]. Available from: <https://www.astro.org/Daily-Practice/Reimbursement/Model-Policies>.
3. Ammirati, M, Nahed, BV, Andrews, D, et al. Congress of Neurological Surgeons systematic review and evidence-based guidelines on treatment options for adults with multiple metastatic brain tumors. *Neurosurgery*. 2019;84(3):E180-E2.
4. Andrews, DW, Scott, CB, Sperduto, PW, et al. Whole brain radiation therapy with or without stereotactic radiosurgery boost for patients with one to three brain metastases: phase III results of the RTOG 9508 randomised trial. *Lancet*. 2004;363(9422):1665-72.
5. Aoyama, H, Shirato, H, Tago, M, et al. Stereotactic radiosurgery plus whole-brain radiation therapy vs stereotactic radiosurgery alone for treatment of brain metastases: a randomized controlled trial. *JAMA*. 2006;295(21):2483-91.
6. Baumert, BG, Hegi, ME, van den Bent, MJ, et al. Temozolomide chemotherapy versus radiotherapy in high-risk low-grade glioma (EORTC 22033-26033): a randomised, open-label, phase 3 intergroup study. *Lancet Oncol*. 2016;17(11):1521-32.
7. Borgelt, B, Gelber, R, Kramer, S, et al. The palliation of brain metastases: final results of the first two studies by the Radiation Therapy Oncology Group. *Int J Radiat Oncol Biol Phys*. 1980;6(1):1-9.
8. Brada, M, Ajithkumar, TV, Minniti, G. Radiosurgery for pituitary adenomas. *Clin Endocrinol (Oxf)*. 2004;61(5):531-43.
9. Brown, PD, Gondi, V, Pugh, S, et al. Hippocampal avoidance during whole-brain radiotherapy plus memantine for patients with brain metastases: phase III trial NRG Oncology CC001. *J Clin Oncol*. 2020;38(10):1019-29.

10. Cabrera, AR, Kirkpatrick, JP, Fiveash, JB, et al. Radiation therapy for glioblastoma: Executive summary of an American Society for Radiation Oncology evidence-based clinical practice guideline. *Pract Radiat Oncol.* 2016;6(4):217-25.
11. Cardinale, R, Won, M, Choucair, A, et al. A phase II trial of accelerated radiotherapy using weekly stereotactic conformal boost for supratentorial glioblastoma multiforme: RTOG 0023. *Int J Radiat Oncol Biol Phys.* 2006;65(5):1422-8.
12. Carlson, ML, Vivas, EX, McCracken, DJ, et al. Congress of Neurological Surgeons systematic review and evidence-based guidelines on hearing preservation outcomes in patients with sporadic vestibular schwannomas. *Neurosurgery.* 2018;82(2):E35-E9.
13. Chao, ST, De Salles, A, Hayashi, M, et al. Stereotactic radiosurgery in the management of limited (1-4) brain metastases: systematic review and International Stereotactic Radiosurgery Society practice guideline. *Neurosurgery.* 2018;83(3):345-53.
14. Chung, LK, Nguyen, TP, Sheppard, JP, et al. A systematic review of radiosurgery versus surgery for neurofibromatosis type 2 vestibular schwannomas. *World Neurosurg.* 2018;109:47-58.
15. Elder, JB, Nahed, BV, Linskey, ME, et al. Congress of Neurological Surgeons systematic review and evidence-based guidelines on the role of emerging and investigational therapies for the treatment of adults with metastatic brain tumors. *Neurosurgery.* 2019;84(3):E201-E3.
16. Fuentes, R, Osorio, D, Exposito Hernandez, J, et al. Surgery versus stereotactic radiotherapy for people with single or solitary brain metastasis. *Cochrane Database Syst Rev.* 2018;Issue 8(Art. No. CD012086):1-50.
17. Fuller, CD, Choi, M, Forthuber, B, et al. Standard fractionation intensity modulated radiation therapy (IMRT) of primary and recurrent glioblastoma multiforme. *Radiat Oncol.* 2007;2:26.
18. Gaspar, LE, Prabhu, RS, Hdeib, A, et al. Congress of Neurological Surgeons systematic review and evidence-based guidelines on the role of whole brain radiation therapy in adults with newly diagnosed metastatic brain tumors. *Neurosurgery.* 2019;84(3):E159-E62.
19. Germano, IM, Sheehan, J, Parish, J, et al. Congress of Neurological Surgeons systematic review and evidence-based guidelines on the role of radiosurgery and radiation therapy in the management of patients with vestibular schwannomas. *Neurosurgery.* 2018;82(2):E49-E51.
20. Gondi, V, Pugh, SL, Mehta, MP, et al. NRG Oncology CC003: a randomized phase II/III trial of prophylactic cranial irradiation with or without hippocampal avoidance for small cell lung cancer. *J Clin Oncol.* 2019;37(15 Suppl):abstract TPS8578.
21. Gondi, V, Pugh, SL, Tome, WA, et al. Preservation of memory with conformal avoidance of the hippocampal neural stem-cell compartment during whole-brain radiotherapy for brain metastases (RTOG 0933): a phase II multi-institutional trial. *J Clin Oncol.* 2014;32(34):3810-6.
22. Klobukowski, L, Falkov, A, Chelimo, C, et al. A retrospective review of re-irradiating patients' recurrent high-grade gliomas. *Clin Oncol (R Coll Radiol).* 2018;30(9):563-70.
23. Kondziolka, D, Perez, B, Flickinger, JC, et al. Gamma knife radiosurgery for trigeminal neuralgia: results and expectations. *Arch Neurol.* 1998;55(12):1524-9.
24. Kurtz, JM, Gelber, R, Brady, LW, et al. The palliation of brain metastases in a favorable patient population: a randomized clinical trial by the Radiation Therapy Oncology Group. *Int J Radiat Oncol Biol Phys.* 1981;7(7):891-5.
25. Lee, CC, Trifiletti, DM, Sahgal, A, et al. Stereotactic radiosurgery for benign (World Health Organization Grade I) cavernous sinus meningiomas-International Stereotactic Radiosurgery Society (ISRS) practice guideline: a systematic review. *Neurosurgery.* 2018;83(6):1128-42.
26. Linskey, ME, Andrews, DW, Asher, AL, et al. The role of stereotactic radiosurgery in the management of patients with newly diagnosed brain metastases: a systematic review and evidence-based clinical practice guideline. *J Neurooncol.* 2010;96(1):45-68.
27. Lunsford, LD, Kondziolka, D, Flickinger, JC, et al. Stereotactic radiosurgery for arteriovenous malformations of the brain. *J Neurosurg.* 1991;75(4):512-24.
28. Maniakas, A, Saliba, I. Microsurgery versus stereotactic radiation for small vestibular schwannomas: a meta-analysis of patients with more than 5 years' follow-up. *Otol Neurotol.* 2012;33(9):1611-20.
29. Minniti, G, Amichetti, M, Enrici, RM. Radiotherapy and radiosurgery for benign skull base meningiomas. *Radiat Oncol.* 2009;4:42.
30. Nahed, BV, Alvarez-Breckenridge, C, Brastianos, PK, et al. Congress of Neurological Surgeons systematic review and evidence-based guidelines on the role of surgery in the management of adults with metastatic brain tumors. *Neurosurgery.* 2019;84(3):E152-E5.
31. NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines®) for Central Nervous System Cancers (Version 2.2020). Available at <http://www.nccn.org>. ©National Comprehensive Cancer Network, 2020.
32. Patchell, RA, Tibbs, PA, Regine, WF, et al. Postoperative radiotherapy in the treatment of single metastases to the brain: a randomized trial. *JAMA.* 1998;280(17):1485-9.
33. Sheehan, JP, Yen, CP, Lee, CC, et al. Cranial stereotactic radiosurgery: current status of the initial paradigm shifter. *J Clin Oncol.* 2014;32(26):2836-46.
34. Sneed, PK, Suh, JH, Goetsch, SJ, et al. A multi-institutional review of radiosurgery alone vs. radiosurgery with whole brain radiotherapy as the initial management of brain metastases. *Int J Radiat Oncol Biol Phys.* 2002;53(3):519-26.

35. Soffietti, R, Kocher, M, Abacioglu, UM, et al. A European Organisation for Research and Treatment of Cancer phase III trial of adjuvant whole-brain radiotherapy versus observation in patients with one to three brain metastases from solid tumors after surgical resection or radiosurgery: quality-of-life results. *J Clin Oncol*. 2013;31(1):65-72.
36. Souhami, L, Seiferheld, W, Brachman, D, et al. Randomized comparison of stereotactic radiosurgery followed by conventional radiotherapy with carmustine to conventional radiotherapy with carmustine for patients with glioblastoma multiforme: report of Radiation Therapy Oncology Group 93-05 protocol. *Int J Radiat Oncol Biol Phys*. 2004;60(3):853-60.
37. Starke, RM, Przybylowski, CJ, Sugoto, M, et al. Gamma Knife radiosurgery of large skull base meningiomas. *J Neurosurg*. 2015;122(2):363-72.
38. Stupp, R, Hegi, ME, Mason, WP, et al. Effects of radiotherapy with concomitant and adjuvant temozolomide versus radiotherapy alone on survival in glioblastoma in a randomised phase III study: 5-year analysis of the EORTC-NCIC trial. *Lancet Oncol*. 2009;10(5):459-66.
39. Thibouw, D, Truc, G, Bertaut, A, et al. Clinical and dosimetric study of radiotherapy for glioblastoma: three-dimensional conformal radiotherapy versus intensity-modulated radiotherapy. *J Neurooncol*. 2018;137(2):429-38.
40. Tsao, MN, Rades, D, Wirth, A, et al. Radiotherapeutic and surgical management for newly diagnosed brain metastasis(es): an American Society for Radiation Oncology evidence-based guideline. *Pract Radiat Oncol*. 2012;2(3):210-25.
41. Tsao, MN, Sahgal, A, Xu, W, et al. Stereotactic radiosurgery for vestibular schwannoma: International Stereotactic Radiosurgery Society (ISRS) practice guideline. *J Radiosurg SBRT*. 2017;5(1):5-24.
42. Wang, TJC, Wu, CC, Jani, A, et al. Hypofractionated radiation therapy versus standard fractionated radiation therapy with concurrent temozolomide in elderly patients with newly diagnosed glioblastoma. *Pract Radiat Oncol*. 2016;6(5):306-14.
43. Wang, Z, Nabhan, M, Schild, SE, et al. Charged particle radiation therapy for uveal melanoma: a systematic review and meta-analysis. *Int J Radiat Oncol Biol Phys*. 2013;86(1):18-26.
44. Zehetmayer, M. Stereotactic photon beam irradiation of uveal melanoma. *Dev Ophthalmol*. 2012;49:58-65.
45. Zhang, N, Pan, L, Dai, JZ, et al. Gamma knife radiosurgery for jugular foramen schwannomas. *J Neurosurg*. 2002;97(5 Suppl):456-8.

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These Guidelines are a work in progress that may be refined as often as new significant data becomes available.

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Colorectal and Anal Cancers

General Information

Commonly Used Modalities

External Beam Radiation Therapy

- 2D or 3D conformal
- Intensity Modulated Radiation Therapy (IMRT)
- Stereotactic Body Radiation Therapy (SBRT)

Radiation Oncology Considerations

Anal Cancer

Cancer of the anal region are relatively rare, accounting for less than 3% of all digestive system cancers. They are almost always squamous cell carcinomas and are frequently associated with HPV infection. Because of the lymphatic drainage of this area, the inguinal lymph nodes are at risk and are commonly involved when lesions involve the area below the dentate line. Although these cancers have been treated with abdominoperineal resection in the past, the current standard of care is concomitant chemoradiotherapy with a fluoropyrimidine and either mitomycin or cisplatin. Doses of 45 Gy are given for early stage tumors. More advanced and node positive cancers are treated to doses of 54-59.4 Gy. IMRT techniques, which can reduce the toxicity associated with radiation, are preferred over 3D conformal techniques for the treatment of anal cancer and cancers of the anal canal. The radiation field includes the pelvis, the anus, the perineum, and the inguinal lymph nodes. Definitive treatment of anal cancers typically involves concurrent radiation and chemotherapy.

Palliative radiation with 3D conformal techniques is recommended for metastatic disease or to enhance local control of a symptomatic bulky primary.

Rectal Cancer

Colorectal cancer is much more common than anal cancer and is the second most common cause of cancer death. Rectal cancers, which occur below the peritoneal reflection, benefit from radiation therapy which has been shown to reduce local recurrence and improve survival. Radiation is generally given with 5-fluorouracil or capecitabine chemotherapy. Preoperative chemoradiation is preferable because it is better tolerated and improves the chance of sphincter sparing surgery in marginally resectable patients. Precision techniques like 3D conformal radiotherapy and IMRT have been shown to reduce the dose to bowel and minimize side effects. The radiation field should include the presacral nodes, internal iliac nodes, and external iliac nodes for T4 tumors. Typically, 45 Gy is given to the initial field with an additional 5.4 – 9 Gy being given to a cone down boost field. Short-course preoperative radiotherapy to a dose of 25 Gy is another alternative.

Colon Cancer

Radiation is not a standard part of local treatment for colon cancer, but is incorporated into treatment for selected patients. It is generally used in situations where there is an elevated risk of local recurrence due to local invasion of the surrounding tissues. 3D conformal radiation is the standard option, and IMRT is reserved for repeat irradiation of previously treated patients.

Stereotactic radiation techniques have been considered in highly selected cases of limited hepatic metastases; however, surgical resection is the standard of care. Please see the section on hepatobiliary cancers for more guidance on the treatment of liver metastases.

For review of metastatic sites, please refer to specific guidelines for the appropriate location (e.g., CNS Cancers for brain metastases, Lung Cancer for lung metastases).

Clinical Indications

2D or 3D Conformal is appropriate for colorectal cancers when ANY of the following conditions are met:

- Primary treatment of colon, rectal, and anal cancers (often in combination with chemotherapy)
- Palliation of metastatic disease, particularly to control symptoms

Anal Cancer

Intensity Modulated Radiation Therapy (IMRT) is appropriate for anal cancer when the following condition is met:

- Treatment of cancer of the anus and anal canal

Stereotactic Body Radiation Therapy (SBRT) is appropriate for anal cancer when the following condition is met:

- Only to treat a previously irradiated field

Rectal Cancer

Intensity Modulated Radiation Therapy (IMRT) is appropriate for rectal cancer when the following condition is met:

- Treatment of rectal adenocarcinoma

Stereotactic Body Radiation Therapy (SBRT) is appropriate for rectal cancer when the following condition is met:

- Only to treat a previously irradiated field

Colon Cancer

Intensity Modulated Radiation Therapy (IMRT) is appropriate for colon cancer when the following condition is met:

- Only to treat a previously irradiated field

Stereotactic Body Radiation Therapy (SBRT) is appropriate for colon cancer when the following condition is met:

- Only to treat a previously irradiated field

Codes

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The following code list is not meant to be all-inclusive. Authorization requirements will vary by health plan. Please consult the applicable health plan for guidance on specific procedure codes.

Specific CPT codes for services should be used when available. Nonspecific or not otherwise classified codes may be subject to additional documentation requirements and review.

3D Conformal

CPT/HCPCS

77295 3-dimensional radiotherapy plan, including dose-volume histograms (3D Conformal treatment plan)

ICD-10 Diagnoses

Not specified

Intensity Modulated Radiation Therapy

CPT/HCPCS

- 77301 Intensity modulated radiation therapy plan, including dose volume histogram for target and critical structure partial tolerance specifications (Listed once only)
- 77338 Multi-leaf collimator (MLC) device(s) for intensity modulated radiation therapy (IMRT), design and construction per IMRT plan
- 77386 Intensity modulated radiation treatment delivery (IMRT), includes guidance and tracking, when performed; complex
- G6015 Intensity modulated Treatment delivery, single or multiple fields/arcs, via narrow spatially and temporally modulated beams, binary, dynamic MLC, per treatment session
- G6016 Compensator-based beam modulation treatment delivery of inverse planned treatment using 3 or more high resolution (milled or cast) compensator convergent beam modulated fields, per treatment session

ICD-10 Diagnoses

- C18.0 - C18.9 Malignant neoplasm of colon
- C19 - C21.8 Malignant neoplasm rectum, rectosigmoid junction and anus
- Z92.3 Personal history of irradiation

Stereotactic Body Radiation Therapy

CPT/HCPCS

- 77295 3-dimensional radiotherapy plan, including dose-volume histograms
- 77301 Intensity modulated radiotherapy plan, including dose-volume histograms for target and critical structure partial tolerance specifications (Listed once only)
- 77338 Multi-leaf collimator (MLC) device(s) for intensity modulated radiation therapy (IMRT), design and construction per IMRT plan
- 77370 Special medical radiation physics consultation
- 77373 Stereotactic body radiation therapy, treatment delivery, per fraction to 1 or more lesions, including image guidance, entire course not to exceed 5 fractions
- 77435 Stereotactic body radiation therapy, treatment management, per treatment course, to 1 or more lesions, including image guidance, entire course not to exceed 5 fractions
- 77470 Special treatment procedure
- G0339 Image guided robotic linear accelerator-based stereotactic radiosurgery, complete course of therapy in one session or first session of fractionated treatment
- G0340 Image guided robotic linear accelerator-based stereotactic radiosurgery, delivery including collimator changes and custom plugging, fractionated treatment, all lesions, per session, second through fifth sessions, maximum 5 sessions per course of treatment

ICD-10 Diagnoses (SBRT/SRS)

- Z92.3 Personal history of irradiation

References

1. American Society for Radiation Oncology (ASTRO). ASTRO model policies: intensity modulated radiation therapy (IMRT). ([Updated 06-06-2019]) [18 p.]. Available from: <https://www.astro.org/Daily-Practice/Reimbursement/Model-Policies>.
2. Chuong, MD, Freilich, JM, Hoffe, SE, et al. Intensity-Modulated Radiation Therapy vs. 3D Conformal Radiation Therapy for Squamous Cell Carcinoma of the Anal Canal. *Gastrointest Cancer Res.* 2013;6(2):39-45.
3. Frakulli, R, Buwenge, M, Cammelli, S, et al. Brachytherapy boost after chemoradiation in anal cancer: a systematic review. *J Contemp Brachytherapy.* 2018;10(3):246-53.
4. Goodman, KA, Patton, CE, Fisher, GA, et al. Appropriate customization of radiation therapy for stage II and III rectal cancer: executive summary of an ASTRO clinical practice statement using the RAND/UCLA Appropriateness Method. *Pract Radiat Oncol.* 2016;6(3):166-75.
5. Guerrero Urbano, MT, Henrys, AJ, Adams, EJ, et al. Intensity-modulated radiotherapy in patients with locally advanced rectal cancer reduces volume of bowel treated to high dose levels. *Int J Radiat Oncol Biol Phys.* 2006;65(3):907-16.
6. Huang, CM, Huang, MY, Tsai, HL, et al. A retrospective comparison of outcome and toxicity of preoperative image-guided intensity-modulated radiotherapy versus conventional pelvic radiotherapy for locally advanced rectal carcinoma. *J Radiat Res (Tokyo).* 2017;58(2):247-59.

7. Milano, MT, Jani, AB, Farrey, KJ, et al. Intensity-modulated radiation therapy (IMRT) in the treatment of anal cancer: toxicity and clinical outcome. *Int J Radiat Oncol Biol Phys.* 2005;63(2):354-61.
8. Minsky, BD. Neoadjuvant treatment strategies: advanced radiation alternatives. *Clinics in Colon & Rectal Surgery.* 2017;30(5):377-82.
9. Myerson, RJ, Garofalo, MC, El Naqa, I, et al. Elective clinical target volumes for conformal therapy in anorectal cancer: a radiation therapy oncology group consensus panel contouring atlas. *Int J Radiat Oncol Biol Phys.* 2009;74(3):824-30.
10. Pepek, JM, Willett, CG, Wu, QJ, et al. Intensity-modulated radiation therapy for anal malignancies: a preliminary toxicity and disease outcomes analysis. *Int J Radiat Oncol Biol Phys.* 2010;78(5):1413-9.
11. Salama, JK, Mell, LK, Schomas, DA, et al. Concurrent chemotherapy and intensity-modulated radiation therapy for anal canal cancer patients: a multicenter experience. *J Clin Oncol.* 2007;25(29):4581-6.
12. Samuelian, JM, Callister, MD, Ashman, JB, et al. Reduced acute bowel toxicity in patients treated with intensity-modulated radiotherapy for rectal cancer. *Int J Radiat Oncol Biol Phys.* 2012;82(5):1981-7.
13. Sun, Z, Adam, MA, Kim, J, et al. Intensity-modulated radiation therapy is not associated with perioperative or survival benefit over 3D-conformal radiotherapy for rectal cancer. *J Gastrointest Surg.* 2017;21(1):106-11.
14. Wee, CW, Kang, HC, Wu, HG, et al. Intensity-modulated radiotherapy versus three-dimensional conformal radiotherapy in rectal cancer treated with neoadjuvant concurrent chemoradiation: a meta-analysis and pooled-analysis of acute toxicity. *Jpn J Clin Oncol.* 2018;48(5):458-66.
15. Yang, TJ, Oh, JH, Son, CH, et al. Predictors of acute gastrointestinal toxicity during pelvic chemoradiotherapy in patients with rectal cancer. *Gastrointest Cancer Res.* 2013;6(5-6):129-36.
16. Zagar, TM, Willett, CG, Czito, BG. Intensity-modulated radiation therapy for anal cancer: toxicity versus outcomes. *Oncology (Williston).* 2010;24(9):815-23, 28.

Gastrointestinal Cancers, Non-Colorectal: Cholangiocarcinoma, Esophageal, Gastric, Liver, Pancreatic

General Information

Commonly Used Modalities

Internal Radiation Therapy (Brachytherapy)

External Beam Radiation Therapy

- 2D or 3D conformal
- Intensity Modulated Radiation Therapy (IMRT)
- Stereotactic Body Radiation Therapy (SBRT)

Radiation Oncology Considerations

Esophageal Cancer

Esophageal cancers can be histologically classified as squamous cell carcinoma or adenocarcinoma. Squamous cancers are more common in the cervical and mid-thoracic esophagus while adenocarcinomas are more common in the distal esophagus and gastroesophageal junction. The latter are more common in Western countries and are associated with gastroesophageal reflux and Barrett's esophagus. Radiation therapy is a common part of the multidisciplinary treatment of esophageal cancers. Radiation can be used preoperatively, post-operatively, as primary therapy in conjunction with chemotherapy or as a palliative modality to improve swallowing. Long-term results of the CROSS randomized controlled trial of neoadjuvant chemoradiation followed by surgery showed improved survival compared to surgery alone. Radiation in that study was given with 3D conformal techniques. IMRT is still under active investigation for treatment of esophageal cancer. Retrospective comparisons have not demonstrated improved survival but have shown a decrease in grade 3 toxicities such as hospitalization, feeding tube placement and greater than 20% weight loss. IMRT should only be used in curative cases where 3D conformal planning shows unacceptable doses to surrounding structures including the heart, lungs, spinal cord or small bowel. In these cases, a documented 3D conformal plan may be requested for review.

Gastric Cancer

Gastric cancer is relatively uncommon in the U.S. but is a common cause of cancer and cancer mortality worldwide. It is associated with *Helicobacter pylori* infection, smoking and heavy drinking. Gastric cancer frequently presents at an advanced stage. Chemoradiation has an established role in the adjuvant treatment of resected tumors based on the results of intergroup study 0116. Patients in that randomized study who received chemoradiation had improved survival compared to patients treated with surgery alone. Use of 3D treatment planning is recommended. Treatment recommendations depend on the location of the bulk of the tumor, location and lymph node involvement. In addition to adjuvant post-operative treatment, radiation is used in a variety of clinical situations, including preoperative treatment, in combination with chemotherapy, and as a palliative therapy. Significant supportive care is required during a full course of treatment. No prospective studies of IMRT in gastric cancer have been published. Several institutions have noted improved dose distribution and better organ sparing with IMRT for stomach cancer. No survival advantage with IMRT has been reported.

Hepatobiliary Cancer

Hepatocellular carcinoma (HCC) and cholangiocarcinomas of the gallbladder, intrahepatic and extrahepatic bile ducts are relatively rare but lethal cancers of the liver and bile ducts. HCC is commonly associated with cirrhosis due to hepatitis and other factors. Although there are no prospective data on the use of IMRT for the treatment of these cancers, the liver is very sensitive to radiation therapy and IMRT may have a limited role in the

treatment of HCC and cholangiocarcinoma when 3D conformal therapy would result in unacceptable toxicity due to exposure of the liver and other surrounding normal tissues. There is growing literature support for the use of SBRT as a local treatment option for hepatocellular cancer. This technology remains under active investigation in many clinical situations, and more data is needed to clarify the role of SBRT. Patients should first be evaluated for potential curative therapy, such as resection, radiofrequency ablation (RFA), transcatheter arterial chemoembolization (TACE) or transplantation.

Selective Internal Radiation Therapy (SIRT) is also known as radioembolization. This technique targets the delivery of small beads or microspheres containing yttrium-90 to the tumor. It is used for palliation of liver tumors, and is sometimes used as a bridge to liver transplantation.

Liver Metastases

Metastatic involvement of the liver can occur with many cancer types, especially in gastrointestinal malignancies. For limited disease, treatment options include surgical resection, radiofrequency ablation (RFA) and SBRT. There is also a role for palliative radiotherapy in more advanced disease. The use of stereotactic techniques to treat liver metastases is the subject of clinical trials. There are no randomized comparisons between RFA and SBRT. A single institution retrospective comparison of RFA (112 patients) with SBRT (170 patients) looked at freedom from local progression (FFLP). The median follow up was 24.6 months. For tumors less than 2 cm, the two year FFLP rate was 88.2% with SBRT vs 73.9% with RFA ($P = .06$). For lesions equal or greater than 2 cm, treatment with SBRT showed improved FFLP compared to RFA with a hazard ratio of 0.21 ($P = .005$). Survival and toxicity were similar. The authors concluded for tumors less than 2 cm both SBRT and RFA yield equivalent control but that for tumors 2 cm or greater SBRT is preferred over RFA.

Pancreatic Cancer

For the treatment of pancreatic cancer, radiation is recommended in the setting of unresectable or borderline resectable disease (neoadjuvant or definitive), adjuvant treatment after surgery, and palliation of symptoms. Outside of palliative care, radiation is traditionally administered concurrently with chemotherapy. There is no clear standard for neoadjuvant therapy, and multiple chemoradiotherapy options are available. 3D conformal radiation techniques are considered standard. A recent systematic review by Bittner compares outcomes and toxicity in patients treated with IMRT and 3D conformal radiotherapy for pancreatic adenocarcinoma. There were no apparent differences in overall or progression-free survival. Both nausea/vomiting and diarrhea were statistically lower with IMRT compared to 3D conformal, although the differences were modest (7.8% vs 13% and 2% vs 11.6%, respectively; $P < .001$ for both). Long-term grade 3 or greater GI toxicity was 5% with IMRT vs 10.6% with 3D ($P = .017$). Given the lack of improved outcomes, IMRT should only be used in curative cases where 3D conformal planning would result in unacceptable doses to surrounding normal tissues. Care should be taken to adhere to recommended target coverage and dose specifications as radiation quality has been shown to impact survival in several studies.

Initial experience with single fraction SBRT for unresectable pancreatic cancer resulted in favorable local control rates but high rates of late gastrointestinal complications. Subsequent studies using fractionated SBRT have shown lower rates of late toxicity. A recent retrospective review of locally advanced pancreatic cancer cases in the National Cancer Database (NCDB) compared outcomes between 7,819 patients treated with conventional radiation with outcomes in 631 patients treated with SBRT. Two year overall survival was 16.3% with conventional radiation vs 20.3% in patients treated with SBRT ($P < .001$). This benefit was maintained in the propensity matched analysis. Another retrospective study compared outcomes in the NCDB between chemo alone, chemo plus EBRT, chemo plus IMRT and chemo plus SBRT. Median overall survival results were 9.9 months, 10.9 months, 12 months and 13.9 months, respectively. For the match propensity cohort, overall survival was superior with SBRT vs chemotherapy alone ($P < .018$). SBRT is considered medically necessary for the treatment of locally advanced, non-metastatic adenocarcinoma of the pancreas.

For review of other metastatic sites, please refer to specific guidelines for the appropriate location (e.g., CNS for brain metastases, Lung for lung metastases).

Clinical Indications

2D or 3D conformal is appropriate when ANY of the following conditions are met:

- Primary disease, with or without chemotherapy

- Metastatic disease, particularly for palliation of symptoms

Cholangiocarcinoma

Intensity Modulated Radiation Therapy (IMRT) is appropriate for curative treatment of cholangiocarcinoma **when EITHER of the following conditions is met:**

- Where risk of critical structure exposure would be excessive with 3D conformal treatment (**both must be met**)
 - 3D planning has been done with appropriate techniques to limit toxicity, but organ at risk limits have been exceeded (based on QUANTEC limits*)
 - IMRT demonstrates improvement to tissue exposure to within safe ranges
- To treat a previously irradiated field

Stereotactic Body Radiation Therapy (SBRT) is appropriate for cholangiocarcinoma when the following condition is met:

- Only to treat a previously irradiated field

Brachytherapy is appropriate for cholangiocarcinoma when the following condition is met:

- As adjuvant treatment after surgery for individuals **with ANY of the following:**
 - R1 resection (positive margin)
 - R2 resection (gross residual disease after resection)
 - Carcinoma in situ found at the surgical specimen margin

Esophageal Cancer

Intensity Modulated Radiation Therapy (IMRT) is appropriate for the curative treatment of esophageal cancer **when EITHER of the following conditions is met:**

- Where risk of critical structure (heart, lung) exposure would be excessive with 3D conformal treatment (**both must be met**)
 - 3D planning has been done with appropriate techniques to limit toxicity, but organ at risk limits have been exceeded (based on QUANTEC limits*)
 - IMRT demonstrates improvement to tissue exposure to within safe ranges
- To treat a previously irradiated field

Stereotactic Body Radiation Therapy (SBRT) is appropriate for esophageal cancer when the following condition is met:

- Only to treat a previously irradiated field

Brachytherapy is appropriate for esophageal cancer **when ANY of the following conditions are met:**

- To treat a gross residual tumor or unresectable luminal lesion
- For palliative treatment of an obstructing tumor

Gastric Cancer

Intensity Modulated Radiation Therapy (IMRT) is appropriate for curative treatment of gastric cancer **when EITHER of the following conditions is met:**

- Where risk of critical structure exposure would be excessive with 3D conformal treatment (**both must be met**)
 - 3D planning has been done with appropriate techniques to limit toxicity, but organ at risk limits have been exceeded (based on QUANTEC limits*)
 - IMRT demonstrates improvement to tissue exposure to within safe ranges
- To treat a previously irradiated field

Stereotactic Body Radiation Therapy (SBRT) is appropriate for gastric cancer when the following condition is met:

- Only to treat a previously irradiated field

Liver Cancer

Hepatocellular carcinoma

Intensity Modulated Radiation Therapy (IMRT) is appropriate for the curative treatment of liver cancer **when EITHER of the following conditions is met:**

- Where risk of critical structure exposure would be excessive with 3D conformal treatment (both must be met)
 - 3D planning has been done with appropriate techniques to limit toxicity, but organ at risk limits have been exceeded (based on QUANTEC limits*)
 - IMRT demonstrates improvement to tissue exposure to within safe ranges
- To treat a previously irradiated field

Stereotactic Body Radiation Therapy (SBRT) is appropriate **when ANY of the following conditions are met:**

- As palliative treatment for individuals with liver-related symptoms
- As treatment of up to 3 lesions, as an option to surgery or embolization when these therapies have been done and have failed, or are contraindicated, **when ALL of the following conditions are met:**
 - Diameter less than 6 cm
 - Patients with Child-Pugh category A or B
 - *Note: SBRT has not been established as a safe treatment option in patients with Child-Pugh category C cirrhosis*
 - Individual has a good performance status (ECOG 0-2)
- To treat a previously irradiated field

Liver Metastases

Intensity Modulated Radiation Therapy (IMRT) is appropriate for liver metastases when the following condition is met:

- Only to treat a previously irradiated field

Stereotactic Body Radiation Therapy (SBRT) is appropriate for liver metastases **when ANY of the following conditions are met:**

- As palliative treatment for individuals with liver-related symptoms
- To treat a previously irradiated field

Pancreatic Cancer

Intensity Modulated Radiation Therapy (IMRT) is appropriate for the curative treatment of pancreatic cancer **when EITHER of the following conditions is met:**

- Where risk of critical structure exposure would be excessive with 3D conformal treatment (**both must be met**)
 - 3D planning has been done with appropriate techniques to limit toxicity, but organ at risk limits have been exceeded (based on QUANTEC limits*)
 - IMRT demonstrates improvement to tissue exposure to within safe ranges
- To treat a previously irradiated field

Stereotactic Body Radiation Therapy (SBRT) is appropriate for pancreatic cancer **when EITHER of the following conditions is met:**

- To treat locally advanced or recurrent disease without evidence of distant metastasis
- To treat a previously irradiated field

*QUANTEC limits

Lung: V20 ≤ 30%

Heart: V25 ≤ 10%

Pericardium: Mean dose ≤ 26 Gy OR V30 < 46%

Spinal Cord: Mean dose ≤ 45 Gy OR Maximum dose 50 Gy

Esophagus: Mean dose < 34 Gy

Small bowel: Dmax < 54 Gy

Liver: Mean dose < 30 Gy

Kidney: Mean dose < 18 Gy. If one kidney, < 15% to receive 18 Gy

Codes

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The following codes for treatments and procedures applicable to this document are included below for informational purposes. Inclusion or exclusion of a procedure, diagnosis or device code(s) does not constitute or imply member coverage or provider reimbursement policy. Please refer to the member's contract benefits in effect at the time of service to determine coverage or non-coverage of these services as it applies to an individual member.

The following code list is not meant to be all-inclusive. Authorization requirements will vary by health plan. Please consult the applicable health plan for guidance on specific procedure codes.

Specific CPT codes for services should be used when available. Nonspecific or not otherwise classified codes may be subject to additional documentation requirements and review.

3D Conformal

CPT/HCPCS

77295 3-dimensional radiotherapy plan, including dose-volume histograms

ICD-10 Diagnoses

Not specified

Intensity Modulated Radiation Therapy

CPT/HCPCS

77301 Intensity modulated radiation therapy plan, including dose volume histogram for target and critical structure partial tolerance specifications

77338 Multi-leaf collimator (MLC) device(s) for intensity modulated radiation therapy (IMRT), design and construction per IMRT plan

77386 Intensity modulated radiation treatment delivery (IMRT), includes guidance and tracking, when performed; complex

G6015 Intensity modulated Treatment delivery, single or multiple fields/arcs, via narrow spatially and temporally modulated beams, binary, dynamic MLC, per treatment session

G6016 Compensator-based beam modulation treatment delivery of inverse planned treatment using 3 or more high resolution (milled or cast) compensator convergent beam modulated fields, per treatment session

ICD-10 Diagnoses

C15.3 - C15.9 Malignant neoplasm esophagus

C16.0 - C16.9 Malignant neoplasm stomach

C22.0 Hepatocellular carcinoma

C22.1 Cholangiocarcinoma

C24.0 Malignant neoplasm extrahepatic bile ducts

C25.0 - C25.9 Malignant neoplasm pancreas
 C78.7 Secondary malignancy, liver
 Z92.3 Personal history of irradiation

Stereotactic Body Radiation Therapy

CPT/HCPCS

77295 3-dimensional radiotherapy plan, including dose-volume histograms
 77301 Intensity modulated radiotherapy plan, including dose-volume histograms for target and critical structure partial tolerance specifications (Listed once only)
 77338 Multi-leaf collimator (MLC) device(s) for intensity modulated radiation therapy (IMRT), design and construction per IMRT plan
 77370 Special medical radiation physics consultation
 77373 Stereotactic body radiation therapy, treatment delivery, per fraction to 1 or more lesions, including image guidance, entire course not to exceed 5 fractions
 77435 Stereotactic body radiation therapy, treatment management, per treatment course, to 1 or more lesions, including image guidance, entire course not to exceed 5 fractions
 77470 Special treatment procedure
 G0339 Image guided robotic linear accelerator-based stereotactic radiosurgery, complete course of therapy in one session or first session of fractionated treatment
 G0340 Image guided robotic linear accelerator-based stereotactic radiosurgery, delivery including collimator changes and custom plugging, fractionated treatment, all lesions, per session, second through fifth sessions, maximum 5 sessions per course of treatment

ICD-10 Diagnoses (SBRT/SRS)

C22.0 Hepatocellular carcinoma
 C78.7 Secondary malignancy, liver
 Z51.5 Encounter for palliative care
 Z92.3 Personal history of irradiation

Brachytherapy

CPT/HCPCS

77295 3-dimensional radiotherapy plan, including dose-volume histograms
 77316 Brachytherapy isodose plan; simple (1-4 sources or 1 channel), includes basic dosimetry calculations (Do not bill 77300)
 77317 Brachytherapy isodose plan; intermediate (5-10 sources or 2-12 channels), includes basic dosimetry calculation (Do not bill 77300)
 77318 Brachytherapy isodose plan; complex (over 10 sources or over 12 channels), includes basic dosimetry calculations (Do not bill 77300)
 77370 Special medical radiation physics consultation
 77470 Special treatment procedure
 77761 Intracavitary radiation source application; simple
 77762 Intracavitary radiation source application; intermediate
 77763 Intracavitary radiation source application; complex
 77770 Remote afterloading high dose rate radionuclide interstitial or intracavitary brachytherapy, includes basic dosimetry, when performed; 1 channel
 77771 Remote afterloading high dose rate radionuclide interstitial or intracavitary brachytherapy, includes basic dosimetry, when performed; 2-12 channels
 77772 Remote afterloading high dose rate radionuclide interstitial or intracavitary brachytherapy, includes basic dosimetry, when performed; over 12 channels

ICD-10 Diagnoses

C15.3 - C15.9 Malignant neoplasm esophagus
 C22.1 Cholangiocarcinoma
 C24.0 Malignant neoplasm extrahepatic bile ducts

D00.1..... Carcinoma in-situ, esophagus

References

1. Abrams, RA, Winter, KA, Regine, WF, et al. Failure to adhere to protocol specified radiation therapy guidelines was associated with decreased survival in RTOG 9704--a phase III trial of adjuvant chemotherapy and chemoradiotherapy for patients with resected adenocarcinoma of the pancreas. *Int J Radiat Oncol Biol Phys.* 2012;82(2):809-16.
2. Alani, S, Soyfer, V, Strauss, N, et al. Limited advantages of intensity-modulated radiotherapy over 3D conformal radiation therapy in the adjuvant management of gastric cancer. *Int J Radiat Oncol Biol Phys.* 2009;74(2):562-6.
3. American Society for Radiation Oncology (ASTRO). ASTRO model policies: intensity modulated radiation therapy (IMRT). ([Updated 06-06-2019]) [18 p.]. Available from: <https://www.astro.org/Daily-Practice/Reimbursement/Model-Policies>.
4. Andolino, DL, Johnson, CS, Maluccio, M, et al. Stereotactic body radiotherapy for primary hepatocellular carcinoma. *Int J Radiat Oncol Biol Phys.* 2011;81(4):e447-53.
5. Balaban, EP, Mangu, PB, Khorana, AA, et al. Locally Advanced, Unresectable Pancreatic Cancer: American Society of Clinical Oncology Clinical Practice Guideline. *J Clin Oncol.* 2016;34(22):2654-68.
6. Bentzen, SM, Constine, LS, Deasy, JO, et al. Quantitative Analyses of Normal Tissue Effects in the Clinic (QUANTEC): an introduction to the scientific issues. *Int J Radiat Oncol Biol Phys.* 2010;76(3 Suppl):S3-9.
7. Bittner, MI, Grosu, AL, Brunner, TB. Comparison of toxicity after IMRT and 3D-conformal radiotherapy for patients with pancreatic cancer - a systematic review. *Radiother Oncol.* 2015;114(1):117-21.
8. Bujold, A, Massey, CA, Kim, JJ, et al. Sequential phase I and II trials of stereotactic body radiotherapy for locally advanced hepatocellular carcinoma. *J Clin Oncol.* 2013;31(13):1631-9.
9. Comito, T, Cozzi, L, Zerbi, A, et al. Clinical results of stereotactic body radiotherapy (SBRT) in the treatment of isolated local recurrence of pancreatic cancer after R0 surgery: A retrospective study. *Eur J Surg Oncol.* 2017;43(4):735-42.
10. Dawson, LA, Kavanagh, BD, Paulino, AC, et al. Radiation-associated kidney injury. *Int J Radiat Oncol Biol Phys.* 2010;76(3 Suppl):S108-15.
11. de Geus, SWL, Eskander, MF, Kasumova, GG, et al. Stereotactic body radiotherapy for unresected pancreatic cancer: A nationwide review. *Cancer.* 2017;123(21):4158-67.
12. Freilich, J, Hoffe, SE, Almehanna, K, et al. Comparative outcomes for three-dimensional conformal versus intensity-modulated radiation therapy for esophageal cancer. *Dis Esophagus.* 2015;28(4):352-7.
13. Gagliardi, G, Constine, LS, Moiseenko, V, et al. Radiation dose-volume effects in the heart. *Int J Radiat Oncol Biol Phys.* 2010;76(3 Suppl):S77-85.
14. Goodman, KA. Stereotactic Body Radiation Therapy for Pancreatic Cancer. *Cancer J.* 2016;22(4):290-5.
15. Jackson, WC, Tao, Y, Mendiratta-Lala, M, et al. Comparison of stereotactic body radiation therapy and radiofrequency ablation in the treatment of intrahepatic metastases. *Int J Radiat Oncol Biol Phys.* 2018;100(4):950-8.
16. Kirkpatrick, JP, van der Kogel, AJ, Schultheiss, TE. Radiation dose-volume effects in the spinal cord. *Int J Radiat Oncol Biol Phys.* 2010;76(3 Suppl):S42-9.
17. Macdonald, JS, Smalley, SR, Benedetti, J, et al. Chemoradiotherapy after surgery compared with surgery alone for adenocarcinoma of the stomach or gastroesophageal junction. *N Engl J Med.* 2001;345(10):725-30.
18. Marks, LB, Bentzen, SM, Deasy, JO, et al. Radiation dose-volume effects in the lung. *Int J Radiat Oncol Biol Phys.* 2010;76(3 Suppl):S70-6.
19. Minn, AY, Hsu, A, La, T, et al. Comparison of intensity-modulated radiotherapy and 3-dimensional conformal radiotherapy as adjuvant therapy for gastric cancer. *Cancer.* 2010;116(16):3943-52.
20. NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines®) for Esophageal and Esophagogastric Junction Cancers (Version 2.2020). Available at <http://www.nccn.org>. ©National Comprehensive Cancer Network, 2020.
21. NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines®) for Gastric Cancer (Version 2.2020). Available at <http://www.nccn.org>. ©National Comprehensive Cancer Network, 2020.
22. Pan, CC, Kavanagh, BD, Dawson, LA, et al. Radiation-associated liver injury. *Int J Radiat Oncol Biol Phys.* 2010;76(3 Suppl):S94-100.
23. Park, JJ, Hajj, C, Reynold, M, et al. Stereotactic body radiation vs. intensity-modulated radiation for unresectable pancreatic cancer. *Acta Oncol.* 2017;56(12):1746-53.
24. Reese, AS, Lu, W, Regine, WF. Utilization of intensity-modulated radiation therapy and image-guided radiation therapy in pancreatic cancer: is it beneficial? *Semin Radiat Oncol.* 2014;24(2):132-9.
25. Rim, CH, Kim, HJ, Seong, J. Clinical feasibility and efficacy of stereotactic body radiotherapy for hepatocellular carcinoma: a systematic review and meta-analysis of observational studies. *Radiother Oncol.* 2019;131:135-44.
26. Rubio, C, Morera, R, Hernando, O, et al. Extracranial stereotactic body radiotherapy. Review of main SBRT features and indications in primary tumors. *Rep Pract Oncol Radiother.* 2013;18(6):387-96.
27. Schefter, TE, Kavanagh, BD, Timmerman, RD, et al. A phase I trial of stereotactic body radiation therapy (SBRT) for liver metastases. *Int J Radiat Oncol Biol Phys.* 2005;62(5):1371-8.

28. Scorsetti, M, Arcangeli, S, Tozzi, A, et al. Is stereotactic body radiation therapy an attractive option for unresectable liver metastases? A preliminary report from a phase 2 trial. *Int J Radiat Oncol Biol Phys.* 2013;86(2):336-42.
29. Shapiro, J, van Lanschot, JJB, Hulshof, M, et al. Neoadjuvant chemoradiotherapy plus surgery versus surgery alone for oesophageal or junctional cancer (CROSS): long-term results of a randomised controlled trial. *Lancet Oncol.* 2015;16(9):1090-8.
30. Smalley, SR, Benedetti, JK, Haller, DG, et al. Updated analysis of SWOG-directed intergroup study 0116: a phase III trial of adjuvant radiochemotherapy versus observation after curative gastric cancer resection. *J Clin Oncol.* 2012;30(19):2327-33.
31. Trip, AK, Nijkamp, J, van Tinteren, H, et al. IMRT limits nephrotoxicity after chemoradiotherapy for gastric cancer. *Radiother Oncol.* 2014;112(2):289-94.
32. Werner-Wasik, M, Yorke, E, Deasy, J, et al. Radiation dose-volume effects in the esophagus. *Int J Radiat Oncol Biol Phys.* 2010;76(3 Suppl):S86-93.
33. Zhong, J, Patel, K, Switchenko, J, et al. Outcomes for patients with locally advanced pancreatic adenocarcinoma treated with stereotactic body radiation therapy versus conventionally fractionated radiation. *Cancer.* 2017;123(18):3486-93.

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These Guidelines are a work in progress that may be refined as often as new significant data becomes available.

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Genitourinary Cancers: Bladder, Penile, and Testicular

General Information

Commonly Used Modalities

Internal Radiation Therapy (Brachytherapy)

External Beam Radiation Therapy

- 2D and 3D conformal
- Intensity Modulated Radiation Therapy (IMRT)
- Stereotactic Body Radiation Therapy (SBRT)

Radiation Oncology Considerations

Bladder Cancer

Bladder cancers arise in the transitional urothelium which lines the urinary bladder. About two-thirds of these do not invade the muscle layer at the time of diagnosis and are treated with transurethral resection (TURBT) with or without instillation of an intravesicle adjuvant therapy such as BCG, mitomycin or gemcitabine. Muscle invasive cancer requires more aggressive treatment. The standard of care is radical cystectomy. Postoperative radiotherapy is indicated for T3 or T4 tumors and when there is involvement of the pelvic lymphatics. Bladder preservation therapy with concurrent chemoradiotherapy is an alternative for highly motivated patients after maximal TURBT and results in 60-80% rates of functional bladder sparing. In the palliative setting, radiation alone is an effective treatment for hematuria. For definitive therapy, it is recommended to treat the whole bladder to 40-45 Gy followed by a boost to the bladder tumor to a total dose up to 66 Gy excluding, if possible, normal areas of the bladder from the boost volume. When high doses of radiotherapy are given, IMRT is often indicated to minimize the dose to pelvic organs at risk, especially the small bowel.

Penile Cancer

Penile cancer is rare and requires multidisciplinary management. Brachytherapy is the preferred approach in selected cases of early stage penile cancers. Concurrent chemoradiotherapy as primary treatment, or after surgery is recommended for larger tumors and when there is nodal involvement. Radiation may also be used when surgical margins are positive.

Testicular Cancer

Following inguinal orchiectomy for early stage pure seminoma, there is an approximately 15% risk of recurrence in the para-aortic lymph nodes. External beam radiation significantly reduces this risk and is an option to surveillance or single agent chemotherapy in stage I disease. Radiation to the para-aortic and ipsilateral iliac nodes is an alternative to chemotherapy in individuals with stage IIA and IIB disease. IMRT is not recommended for treatment of pure testicular seminomas due to the low doses given and the increased risk of secondary malignancy in the kidney, liver, or bowel with IMRT. Radiation is not a standard component in the treatment of non-seminomatous testicular cancer. For review of metastatic sites, please refer to specific guidelines for the appropriate location (e.g., Central Nervous System [CNS] for brain metastases, Lung for lung metastases).

Clinical Indications

2D or 3D conformal is appropriate for genitourinary cancers when ANY of the following conditions are met:

- Primary disease, with or without chemotherapy, particularly to irradiate inguinal and/or pelvic lymph nodes

- Metastatic disease, particularly for palliation of symptoms

Bladder Cancer

Intensity Modulated Radiation Therapy (IMRT) is appropriate for bladder cancer when **ALL of the following conditions are met:**

- To treat primary, non-metastatic bladder carcinoma
- Treatment intent is curative

Stereotactic Body Radiotherapy (SBRT) is appropriate for bladder cancer when the following condition is met:

- Only to treat a previously irradiated field

Penile Cancer

Intensity Modulated Radiation Therapy (IMRT) is appropriate for penile cancer when the following condition is met:

- Only to treat a previously irradiated field

Stereotactic Body Radiotherapy (SBRT) is appropriate for penile cancer when the following condition is met:

- Only to treat a previously irradiated field

Brachytherapy is appropriate for penile cancer when the following condition is met:

- Squamous cell carcinoma, confined to the glans or prepuce when **(both must be met)**
 - Tumor size is less than or equal to 4 cm
 - Inguinal lymph nodes are uninvolved or unable to be assessed (NO or NX)

Testicular Cancer

Intensity Modulated Radiation Therapy (IMRT) is appropriate for testicular cancer when the following condition is met:

- Only to treat a previously irradiated field

Stereotactic Body Radiotherapy (SBRT) is appropriate for testicular cancer when the following condition is met:

- Only to treat a previously irradiated field

Codes

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The following codes for treatments and procedures applicable to this document are included below for informational purposes. Inclusion or exclusion of a procedure, diagnosis or device code(s) does not constitute or imply member coverage or provider reimbursement policy. Please refer to the member's contract benefits in effect at the time of service to determine coverage or non-coverage of these services as it applies to an individual member.

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3D Conformal

CPT/HCPCS

77295 3-dimensional radiotherapy plan, including dose-volume histograms

ICD-10 Diagnoses

Not specified

Intensity Modulated Radiation Therapy

CPT/HCPCS

- 77301 Intensity modulated radiation therapy plan, including dose volume histogram for target and critical structure partial tolerance specifications
- 77338 Multi-leaf collimator (MLC) device(s) for intensity modulated radiation therapy (IMRT), design and construction per IMRT plan
- 77386 Intensity modulated radiation treatment delivery (IMRT), includes guidance and tracking, when performed; complex
- G6015 Intensity modulated Treatment delivery, single or multiple fields/arcs, via narrow spatially and temporally modulated beams, binary, dynamic MLC, per treatment session
- G6016 Compensator-based beam modulation treatment delivery of inverse planned treatment using 3 or more high resolution (milled or cast) compensator convergent beam modulated fields, per treatment session

ICD-10 Diagnoses

- C67.0 - C67.9 Malignant neoplasm bladder
- Z92.3 Personal history of irradiation

Stereotactic Body Radiation Therapy

CPT/HCPCS

- 77295 3-dimensional radiotherapy plan, including dose-volume histograms
- 77301 Intensity modulated radiotherapy plan, including dose-volume histograms for target and critical structure partial tolerance specifications (Listed once only)
- 77338 Multi-leaf collimator (MLC) device(s) for intensity modulated radiation therapy (IMRT), design and construction per IMRT plan
- 77370 Special medical radiation physics consultation
- 77373 Stereotactic body radiation therapy, treatment delivery, per fraction to 1 or more lesions, including image guidance, entire course not to exceed 5 fractions
- 77435 Stereotactic body radiation therapy, treatment management, per treatment course, to 1 or more lesions, including image guidance, entire course not to exceed 5 fractions
- 77470 Special treatment procedure
- G0339 Image guided robotic linear accelerator-based stereotactic radiosurgery, complete course of therapy in one session or first session of fractionated treatment
- G0340 Image guided robotic linear accelerator-based stereotactic radiosurgery, delivery including collimator changes and custom plugging, fractionated treatment, all lesions, per session, second through fifth sessions, maximum 5 sessions per course of treatment

ICD-10 Diagnoses (SBRT/SRS)

- Z92.3 Personal history of irradiation

Brachytherapy

CPT/HCPCS

- 77295 3-dimensional radiotherapy plan, including dose-volume histograms
- 77316 Brachytherapy isodose plan; simple (1-4 sources or 1 channel), includes basic dosimetry calculations (Do not bill 77300)
- 77317 Brachytherapy isodose plan; intermediate (5-10 sources or 2-12 channels), includes basic dosimetry calculation (Do not bill 77300)
- 77318 Brachytherapy isodose plan; complex (over 10 sources or over 12 channels), includes basic dosimetry calculations (Do not bill 77300)
- 77370 Special medical radiation physics consultation
- 77470 Special treatment procedure
- 77761 Intracavitary radiation source application; simple
- 77762 Intracavitary radiation source application; intermediate
- 77763 Intracavitary radiation source application; complex
- 77770 Remote afterloading high dose rate radionuclide interstitial or intracavitary brachytherapy, includes basic dosimetry, when performed; 1 channel

- 77771 Remote afterloading high dose rate radionuclide interstitial or intracavitary brachytherapy, includes basic dosimetry, performed; 2-12 channels
- 77772 Remote afterloading high dose rate radionuclide interstitial or intracavitary brachytherapy, includes basic dosimetry, when performed; over 12 channels
- 77778 Interstitial radiation source application, complex, includes supervision, handling, loading of radiation source, when performed

ICD-10 Diagnoses

C60.0 - C60.9..... Malignant neoplasm penis and other male genital organs

References

1. American Society for Radiation Oncology (ASTRO). ASTRO model policies: intensity modulated radiation therapy (IMRT). ([Updated 06-06-2019]) [18 p.]. Available from: <https://www.astro.org/Daily-Practice/Reimbursement/Model-Policies>.
2. Classen, J, Schmidberger, H, Meisner, C, et al. Radiotherapy for stages IIA/B testicular seminoma: final report of a prospective multicenter clinical trial. *J Clin Oncol*. 2003;21(6):1101-6.
3. Classen, J, Schmidberger, H, Meisner, C, et al. Para-aortic irradiation for stage I testicular seminoma: results of a prospective study in 675 patients. A trial of the German testicular cancer study group (GTCSG). *British Journal of Cancer*. 2004;90(12):2305-11.
4. de Crevoisier, R, Slimane, K, Sanfilippo, N, et al. Long-term results of brachytherapy for carcinoma of the penis confined to the glans (N- or NX). *Int J Radiat Oncol Biol Phys*. 2009;74(4):1150-6.
5. Hall, EJ, Wu, CS. Radiation-induced second cancers: the impact of 3D-CRT and IMRT. *Int J Radiat Oncol Biol Phys*. 2003;56(1):83-8.
6. James, ND, Hussain, SA, Hall, E, et al. Radiotherapy with or without chemotherapy in muscle-invasive bladder cancer. *N Engl J Med*. 2012;366(16):1477-88.
7. Jones, WG, Fossa, SD, Mead, GM, et al. Randomized trial of 30 versus 20 Gy in the adjuvant treatment of stage I Testicular Seminoma: a report on Medical Research Council Trial TE18, European Organisation for the Research and Treatment of Cancer Trial 30942 (ISRCTN18525328). *J Clin Oncol*. 2005;23(6):1200-8.
8. Kaufman, DS, Winter, KA, Shipley, WU, et al. The initial results in muscle-invasive bladder cancer of RTOG 95-06: phase I/II trial of transurethral surgery plus radiation therapy with concurrent cisplatin and 5-fluorouracil followed by selective bladder preservation or cystectomy depending on the initial response. *Oncologist*. 2000;5(6):471-6.
9. Mak, RH, Hunt, D, Shipley, WU, et al. Long-term outcomes in patients with muscle-invasive bladder cancer after selective bladder-preserving combined-modality therapy: a pooled analysis of Radiation Therapy Oncology Group protocols 8802, 8903, 9506, 9706, 9906, and 0233. *J Clin Oncol*. 2014;32(34):3801-9.
10. Muren, LP, Jebsen, N, Gustafsson, A, et al. Can dose-response models predict reliable normal tissue complication probabilities in radical radiotherapy of urinary bladder cancer? The impact of alternative radiation tolerance models and parameters. *Int J Radiat Oncol Biol Phys*. 2001;50(3):627-37.
11. Oliver, RT, Mead, GM, Rustin, GJ, et al. Randomized trial of carboplatin versus radiotherapy for stage I seminoma: mature results on relapse and contralateral testis cancer rates in MRC TE19/EORTC 30982 study (ISRCTN27163214). *J Clin Oncol*. 2011;29(8):957-62.
12. Robinson, R, Marconi, L, MacPepple, E, et al. Risks and benefits of adjuvant radiotherapy after inguinal lymphadenectomy in node-positive penile cancer: a systematic review by the European Association of Urology Penile Cancer Guidelines Panel. *Eur Urol*. 2018;74(1):76-83.

Gynecologic Cancers: Cervical, Fallopian Tube, Ovarian, Uterine, and Vulvar/Vaginal

General Information

Commonly Used Modalities

Internal Radiation Therapy (Brachytherapy)

External Beam Radiation Therapy

- 2D or 3D conformal
- Intensity Modulated Radiation Therapy (IMRT)
- Stereotactic Body Radiation Therapy (SBRT)

Radiation Oncology Considerations

Brachytherapy is considered standard of care in the treatment of many gynecologic malignancies, and both high dose rate (HDR) and low dose rate (LDR) brachytherapy treatments are used.

External beam radiation is used in many clinical situations to treat pelvic tissues and regional lymph nodes. With significant toxicity constraints, particularly gastrointestinal and urologic toxicity, IMRT is often the recommended modality.

IMRT is not routinely recommended for palliative treatment of symptoms in the setting of advanced disease.

Cervical Cancer

In the U.S., cervical cancer is relatively uncommon. About 80% of cases are squamous cell carcinoma. Human papilloma virus (HPV) infection is known to increase the risk of cervical cancer and this had led to development of a vaccine to prevent the disease. Early stage cervical cancer can be treated with either surgery or radiation. More advanced disease is treated with concurrent chemoradiotherapy followed by brachytherapy. If high risk features are found at the time of surgery, adjuvant postoperative radiotherapy is indicated. IMRT is helpful in minimizing radiation dosage to the critical structures in the pelvis, particularly the bowel. Compared to 3D conformal radiotherapy, IMRT has been shown to reduce the incidence of acute and chronic gastrointestinal side effects and also lower the risk of bowel obstruction.

External beam radiation techniques should not be considered alternatives to brachytherapy for an intact cervix.

Brachytherapy is commonly incorporated into the definitive management of cervical cancer. For treatment of the intact cervix, tandem and ovoid or tandem and ring applicators are most often used. For more advanced cases, interstitial implants may be required. Brachytherapy can be delivered with either low dose rate (LDR) or high dose rate (HDR) techniques. When LDR brachytherapy is used, two applications are typically performed. For HDR treatment, up to six fractions are appropriate. Brachytherapy can be used alone for very early stage cervical cancer. More commonly, brachytherapy is used as a boost following external beam radiotherapy. When tumors are not adequately dosed with brachytherapy, completion hysterectomy may be of benefit. Concurrent platinum based chemotherapy has been shown to improve survival compared to radiotherapy alone for early stage high-risk disease as well as advanced stage disease. Chemoradiotherapy has been shown to be more effective than radiotherapy alone in the adjuvant setting in intermediate and high-risk patients but with increased toxicity.

Uterine Neoplasms

Endometrial cancers arise in the uterine lining and commonly present as post-menopausal bleeding. They are more common than cervical cancer with approximately 55,000 cases per year. The primary treatment for endometrial cancer is surgery. Primary radiation can be used in patients who are not surgical candidates. Adjuvant radiation therapy has been shown to decrease recurrences in women at risk. Risk factors for recurrence include age, depth of myometrial invasion, tumor grade and presence of lymphovascular invasion.

Most recurrences are in the vaginal cuff. External beam radiation therapy targets any gross disease present, the parametrial regions, upper vaginal and paravaginal tissues, as well as pelvic lymph nodes (lower common iliac, external iliac, internal iliac, presacral). IMRT techniques reduce the radiation dose to nearby critical pelvic structures, such as small bowel. External pelvic radiotherapy is the preferred treatment for stage IB grade 3 lesions and patients with involved nodes. A brachytherapy boost is appropriate for patients with endocervical or cervical stromal involvement. Whether external radiotherapy can be replaced by vaginal brachytherapy and chemotherapy for high risk stage I and stage II patients is currently being studied by the GOG. Vaginal brachytherapy alone is preferred for most other stage I patients based on the results of the PORTEC-2 randomized trial, although EBRT may be reasonable for those at especially high risk of LRR. As advocated in the 2014 Choosing Wisely campaign, stage IA patients with grade 1 or 2 disease and no other risk factors should be observed.

Regarding electronic brachytherapy, the American Brachytherapy Society states that “it is not recommended that electronic brachytherapy be utilized for accelerated partial breast irradiation, non-melanomatous skin cancers, or vaginal cuff brachytherapy outside prospective clinical trials at this time.”

Uterine sarcomas are rare tumors arising in muscle or connective tissue. Postoperative radiation therapy is recommended for patients at high risk for pelvic recurrence after surgery. As with other gynecologic cancers, IMRT may be used to reduce the dose to the small bowel.

Ovarian Cancer

Radiation therapy is no longer a common component of initial treatment or consolidative therapy for primary epithelial ovarian cancer treatment. Standard of care includes surgical resection or debulking and systemic chemotherapy. Palliative radiation remains an option to manage symptoms in recurrent or metastatic disease.

For review of metastatic sites, please refer to specific guidelines for the appropriate location (e.g., CNS Cancers for brain metastases and Lung Cancer for lung metastases).

Clinical Indications

2D or 3D Conformal is appropriate for gynecologic cancers when ANY of the following conditions are met:

- Primary disease, with or without chemotherapy, particularly to irradiate inguinal and/or pelvic lymph nodes
- Metastatic disease, particularly for palliation of symptoms

Cervical Cancer

Intensity Modulated Radiation Therapy (IMRT) is appropriate for cervical cancer when the following condition is met:

- To treat primary cervical cancer

Stereotactic Body Radiation Therapy (SBRT) is appropriate for cervical cancer when the following condition is met:

- Only to treat a previously irradiated field

Brachytherapy is appropriate for cervical cancer when the following condition is met:

- To treat primary cervical cancer

Note: Electronic brachytherapy is considered not medically necessary.

Fallopian Tube Cancer

Intensity Modulated Radiation Therapy (IMRT) is appropriate for fallopian tube cancer when the following condition is met:

- To treat primary fallopian tube cancer

Stereotactic Body Radiation Therapy (SBRT) is appropriate for fallopian tube cancer when the following condition is met:

- Only to treat a previously irradiated field

Ovarian Cancer

Intensity Modulated Radiation Therapy (IMRT) is appropriate for ovarian cancer when the following condition is met:

- To treat primary ovarian cancer

Stereotactic Body Radiation Therapy (SBRT) is appropriate for ovarian cancer when the following condition is met:

- Only to treat a previously irradiated field

Uterine Neoplasms (Endometrial Carcinoma, Uterine Sarcoma, Uterine Carcinosarcoma)

Intensity Modulated Radiation Therapy (IMRT) is appropriate for uterine neoplasms when the following condition is met:

- To treat individuals with cancer of the uterus, including uterine sarcoma and endometrial carcinoma

Stereotactic Body Radiation Therapy (SBRT) is appropriate for uterine neoplasms when the following condition is met:

- Only to treat a previously irradiated field

Brachytherapy is appropriate for uterine neoplasms when the following condition is met:

- To treat individuals with cancer of the uterus, including uterine sarcoma and endometrial carcinoma

Note: Electronic brachytherapy is considered not medically necessary.

Vulvar/Vaginal Cancer

Intensity Modulated Radiation Therapy (IMRT) is appropriate for vulvar/vaginal cancer when the following condition is met:

- To treat vulvar/vaginal cancer

Stereotactic Body Radiation Therapy (SBRT) is appropriate for vulvar/vaginal cancer when the following condition is met:

- Only to treat a previously irradiated field

Brachytherapy is appropriate for vulvar/vaginal cancer when the following condition is met:

- To treat individuals with vaginal or vulvar cancer

Codes

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The following codes for treatments and procedures applicable to this document are included below for informational purposes. Inclusion or exclusion of a procedure, diagnosis or device code(s) does not constitute or imply member coverage or provider reimbursement policy. Please refer to the member's contract benefits in effect at the time of service to determine coverage or non-coverage of these services as it applies to an individual member.

The following code list is not meant to be all-inclusive. Authorization requirements will vary by health plan. Please consult the applicable health plan for guidance on specific procedure codes.

Specific CPT codes for services should be used when available. Nonspecific or not otherwise classified codes may be subject to additional documentation requirements and review.

3D Conformal

CPT/HCPCS

77295 3-dimensional radiotherapy plan, including dose-volume histograms

ICD-10 Diagnoses

Not specified

Intensity Modulated Radiation Therapy

CPT/HCPCS

77301 Intensity modulated radiation therapy plan, including dose volume histogram for target and critical structure partial tolerance specifications

77338 Multi-leaf collimator (MLC) device(s) for intensity modulated radiation therapy (IMRT), design and construction per IMRT plan

77386 Intensity modulated radiation treatment delivery (IMRT), includes guidance and tracking, when performed; complex

G6015 Intensity modulated Treatment delivery, single or multiple fields/arcs, via narrow spatially and temporally modulated beams, binary, dynamic MLC, per treatment session

G6016 Compensator-based beam modulation treatment delivery of inverse planned treatment using 3 or more high resolution (milled or cast) compensator convergent beam modulated fields, per treatment session

ICD-10 Diagnoses

C51.0 - C51.9 Malignant neoplasm vulva

C52..... Malignant neoplasm vagina

C53.0 - C53.9 Malignant neoplasm cervix

C54.0 - C55..... Malignant neoplasm uterus

C56.1 - C56.9 Malignant neoplasm ovary

C57.00 - C57.02... Malignant neoplasm fallopian tube

C57.7 - C57.9 Malignant neoplasm other and unspecified female genital organs

Z92.3..... Personal history of irradiation

Stereotactic Body Radiation Therapy

CPT/HCPCS

77295 3-dimensional radiotherapy plan, including dose-volume histograms

77301 Intensity modulated radiotherapy plan, including dose-volume histograms for target and critical structure partial tolerance specifications (when specified as treatment planning for SRS or SBRT)

77338 Multi-leaf collimator (MLC) device(s) for intensity modulated radiation therapy (IMRT), design and construction per IMRT plan (when specified as devices for SRS or SBRT)

77370 Special medical radiation physics consultation

77373 Stereotactic body radiation therapy, treatment delivery, per fraction to 1 or more lesions, including image guidance, entire course not to exceed 5 fractions

77435 Stereotactic body radiation therapy, treatment management, per treatment course, to 1 or more lesions, including image guidance, entire course not to exceed 5 fractions

77470 Special treatment procedure

G0339 Image guided robotic linear accelerator-based stereotactic radiosurgery, complete course of therapy in one session or first session of fractionated treatment

G0340 Image guided robotic linear accelerator-based stereotactic radiosurgery, delivery including collimator changes and custom plugging, fractionated treatment, all lesions, per session, second through fifth sessions, maximum 5 sessions per course of treatment

ICD-10 Diagnoses

Z92.3..... Personal history of irradiation

Brachytherapy

CPT/HCPCS

55920	Placement of needles or catheters into pelvic organs and/or genitalia (except prostate) for subsequent interstitial radioelement application
57155	Insertion of uterine tandem and/or vaginal ovoids for clinical brachytherapy
57156	Insertion of a vaginal radiation afterloading apparatus for clinical brachytherapy
58346	Insertion of Heyman capsules for clinical brachytherapy
77295	3-dimensional radiotherapy plan, including dose-volume histograms
77316	Brachytherapy isodose plan; simple (1-4 sources or 1 channel), includes basic dosimetry calculations (Do not bill 77300)
77317	Brachytherapy isodose plan; intermediate (5-10 sources or 2-12 channels), includes basic dosimetry calculation (Do not bill 77300)
77318	Brachytherapy isodose plan; complex (over 10 sources or over 12 channels), includes basic dosimetry calculations (Do not bill 77300)
77370	Special medical radiation physics consultation
77470	Special treatment procedure
77761	Intracavitary radiation source application; simple
77762	Intracavitary radiation source application; intermediate
77763	Intracavitary radiation source application; complex
77770	Remote afterloading high dose rate radionuclide interstitial or intracavitary brachytherapy, includes basic dosimetry, when performed; 1 channel
77771	Remote afterloading high dose rate radionuclide interstitial or intracavitary brachytherapy, includes basic dosimetry, when performed; 2-12 channels
77772	Remote afterloading high dose rate radionuclide interstitial or intracavitary brachytherapy, includes basic dosimetry, when performed; over 12 channels
77778	Interstitial radiation source application, complex, includes supervision, handling, loading of radiation source, when performed
0394T	HDR electronic brachytherapy, skin surface application, per fraction
0395T	HDR electronic brachytherapy, interstitial or intracavitary treatment, per fraction

ICD-10 Diagnoses

C51.0 - C51.9	Malignant neoplasm vulva
C52.....	Malignant neoplasm vagina
C53.0 - C53.9	Malignant neoplasm cervix
C54.0 - C55.....	Malignant neoplasm uterus
D06.0 - D06.9	Carcinoma in situ of cervix uteri
D07.0.....	Carcinoma in situ of endometrium
D07.1.....	Carcinoma in situ of vulva
D07.2.....	Carcinoma in situ of vagina
D07.39.....	Carcinoma in situ of other female genital organs [uterus]

References

1. Albuquerque, K, Folkert, M, Mayadev, J, et al. Adjuvant External Radiation Impacts Outcome of Pelvis-limited Stage III Endometrial Carcinoma: A Multi-institutional Study. *Am J Clin Oncol*. 2018;41(8):792-6.
2. American Society for Radiation Oncology (ASTRO). ASTRO model policies: intensity modulated radiation therapy (IMRT). ([Updated 06-06-2019]) [18 p.]. Available from: <https://www.astro.org/Daily-Practice/Reimbursement/Model-Policies>.
3. Bingham, B, Orton, A, Boothe, D, et al. Brachytherapy Improves Survival in Stage III Endometrial Cancer With Cervical Involvement. *Int J Radiat Oncol Biol Phys*. 2017;97(5):1040-50.
4. Chern, JY, Boyd, LR, Blank, SV. Uterine Sarcomas: The Latest Approaches for These Rare but Potentially Deadly Tumors. *Oncology (Williston)*. 2017;31(3):229-36.
5. Cibula, D, Potter, R, Planchamp, F, et al. The European Society of Gynaecological Oncology/European Society for Radiotherapy and Oncology/European Society of Pathology guidelines for the management of patients with cervical cancer. *Radiother Oncol*. 2018;127(3):404-16.

6. Creutzberg, CL, van Putten, WL, Warlam-Rodenhuis, CC, et al. Outcome of high-risk stage IC, grade 3, compared with stage I endometrial carcinoma patients: the Postoperative Radiation Therapy in Endometrial Carcinoma Trial. *J Clin Oncol*. 2004;22(7):1234-41.
7. Folkert, MR, Shih, KK, Abu-Rustum, NR, et al. Postoperative pelvic intensity-modulated radiotherapy and concurrent chemotherapy in intermediate- and high-risk cervical cancer. *Gynecol Oncol*. 2013;128(2):288-93.
8. Gaffney, DK, Jhingran, A, Portelance, L, et al. Radiation therapy oncology group gynecologic oncology working group: comprehensive results. *Int J Gynecol Cancer*. 2014;24(5):956-62.
9. Gupta, V, McGunigal, M, Prasad-Hayes, M, et al. Adjuvant radiation therapy is associated with improved overall survival in high-intermediate risk stage I endometrial cancer: A national cancer data base analysis. *Gynecol Oncol*. 2017;144(1):119-24.
10. Harkenrider, MM, Adams, W, Block, AM, et al. Improved overall survival with adjuvant radiotherapy for high-intermediate and high risk Stage I endometrial cancer. *Radiother Oncol*. 2017;122(3):452-7.
11. Harris, EE, Latifi, K, Rusthoven, C, et al. Assessment of organ motion in postoperative endometrial and cervical cancer patients treated with intensity-modulated radiation therapy. *Int J Radiat Oncol Biol Phys*. 2011;81(4):e645-50.
12. He, S, Gill, BS, Heron, DE, et al. Long-term outcomes using adjuvant pelvic intensity modulated radiation therapy (IMRT) for endometrial carcinoma. *Pract Radiat Oncol*. 2017;7(1):19-25.
13. Jhingran, A, Salehpour, M, Sam, M, et al. Vaginal motion and bladder and rectal volumes during pelvic intensity-modulated radiation therapy after hysterectomy. *Int J Radiat Oncol Biol Phys*. 2012;82(1):256-62.
14. Jhingran, A, Winter, K, Portelance, L, et al. A phase II study of intensity modulated radiation therapy to the pelvis for postoperative patients with endometrial carcinoma: radiation therapy oncology group trial 0418. *Int J Radiat Oncol Biol Phys*. 2012;84(1):e23-8.
15. Jingjing, H, Rui, J, Hui, P. Adjuvant chemoradiotherapy vs. radiotherapy alone in early-stage high-risk endometrial cancer: a systematic review and meta-analysis. *Eur Rev Med Pharmacol Sci*. 2019;23(2):833-40.
16. Klopp, A, Smith, BD, Alektiar, K, et al. The role of postoperative radiation therapy for endometrial cancer: Executive summary of an American Society for Radiation Oncology evidence-based guideline. *Pract Radiat Oncol*. 2014;4(3):137-44.
17. Lanciano, R, Calkins, A, Bundy, BN, et al. Randomized comparison of weekly cisplatin or protracted venous infusion of fluorouracil in combination with pelvic radiation in advanced cervix cancer: a gynecologic oncology group study. *J Clin Oncol*. 2005;23(33):8289-95.
18. Li, M, Hu, M, Wang, Y, et al. Adjuvant chemoradiotherapy versus radiotherapy in cervical cancer patients with intermediate-risk factors: a systematic review and meta-analysis. *Eur J Obstet Gynecol Reprod Biol*. 2019;238:1-6.
19. Mendez, LC, Leung, E, Cheung, P, et al. The Role of Stereotactic Ablative Body Radiotherapy in Gynaecological Cancers: A Systematic Review. *Clin Oncol (R Coll Radiol)*. 2017;29(6):378-84.
20. NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines®) for Ovarian Cancer Including Fallopian Tube Cancer and Primary Peritoneal Cancer (Version 1.2020). Available at <http://www.nccn.org>. ©National Comprehensive Cancer Network, 2020.
21. Peters, WA, 3rd, Liu, PY, Barrett, RJ, 2nd, et al. Concurrent chemotherapy and pelvic radiation therapy compared with pelvic radiation therapy alone as adjuvant therapy after radical surgery in high-risk early-stage cancer of the cervix. *J Clin Oncol*. 2000;18(8):1606-13.
22. Scholten, AN, van Putten, WL, Beerman, H, et al. Postoperative radiotherapy for Stage 1 endometrial carcinoma: long-term outcome of the randomized PORTEC trial with central pathology review. *Int J Radiat Oncol Biol Phys*. 2005;63(3):834-8.
23. Shih, KK, Hajj, C, Kollmeier, M, et al. Impact of postoperative intensity-modulated radiation therapy (IMRT) on the rate of bowel obstruction in gynecologic malignancy. *Gynecol Oncol*. 2016;143(1):18-21.
24. Shih, KK, Milgrom, SA, Abu-Rustum, NR, et al. Postoperative pelvic intensity-modulated radiotherapy in high risk endometrial cancer. *Gynecol Oncol*. 2013;128(3):535-9.
25. Shrivastava, S, Mahantshetty, U, Engineer, R, et al. Cisplatin chemoradiotherapy vs radiotherapy in FIGO stage IIIB squamous cell carcinoma of the uterine cervix: a randomized clinical trial. *JAMA Oncol*. 2018;4(4):506-13.
26. Stehman, FB, Ali, S, Keys, HM, et al. Radiation therapy with or without weekly cisplatin for bulky stage 1B cervical carcinoma: follow-up of a Gynecologic Oncology Group trial. *Am J Obstet Gynecol*. 2007;197(5):503.e1-6.

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These Guidelines are a work in progress that may be refined as often as new significant data becomes available.

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Head and Neck Cancers (including Thyroid)

General Information

Commonly Used Modalities

Internal Radiation Therapy (Brachytherapy)

External Beam Radiation Therapy

- 2D or 3D conformal
- Intensity Modulated Radiation Therapy (IMRT)
- Stereotactic Body Radiation Therapy (SBRT)

Radiation Oncology Considerations

Head and Neck Cancers are defined as cancers of the lip, oral cavity, oropharynx, hypopharynx, nasopharynx, glottic larynx, supraglottic larynx, ethmoid and maxillary sinus, nasal cavity, salivary glands (including Parotid), Mucosal Melanoma, and Head and Neck occult primary.

IMRT has demonstrated improvement for Head and Neck cancer irradiation by reducing long-term side effects in the oropharyngeal, paranasal sinus, and nasopharyngeal cancers by reducing the dose to salivary glands, temporal lobes, auditory and optic structures. The use of IMRT to other regions has similar benefits and may be administered at the discretion of the ordering physician. However, the use of IMRT for early stage (stages I, II) glottic cancer has not been well established. Definitive or consolidative radiation for head and neck lymphomas often includes similar anatomic targets the other head and neck malignancies and IMRT may be considered medically necessary to spare salivary function and prevent permanent xerostomia.

Differentiated thyroid cancers are most often treated with surgical resection, with or without radioactive iodine (RAI). External beam radiation is used in a variety of clinical situations, including inadequate RAI uptake, unresectable or incompletely resected disease, locoregional recurrence, and metastatic disease.

Anaplastic thyroid cancer represents a highly lethal malignancy, with no clearly effective treatment protocols. External beam radiation, with or without chemotherapy, may improve short-term survival, and can be used to palliate symptoms, particularly airway obstruction. IMRT techniques have been shown to reduce toxicity.

For review of metastatic sites, please refer to specific guidelines for the appropriate location (e.g., CNS for brain metastases, Lung for lung metastases)

Clinical Indications

2D or 3D Conformal is appropriate for head and neck cancer when ANY of the following conditions are met:

- Primary disease, with or without chemotherapy
- Metastatic disease, particularly for palliation of symptoms

Head and Neck

Intensity Modulated Radiation Therapy (IMRT) is appropriate for head and neck cancers **when ANY of the following conditions are met:**

- Glottic cancer, stage III and IV
- Other advanced head and neck cancers
- Lymphomas of the head and neck region
- To treat a previously irradiated field

Stereotactic Body Radiation Therapy (SBRT) is appropriate for head and neck cancer when the following condition is met:

- Only to treat a previously irradiated field

Brachytherapy is appropriate for head and neck cancer when the following condition is met:

- To treat cancers including cancers of the lip, oral cavity, tongue (particularly base of tongue), tonsils, sinuses, nasopharynx, pharynx, and other neck cancers

Neutron Therapy is appropriate for head and neck cancer when the following condition is met:

- To treat a primary salivary gland cancer which is inoperable or recurrent

Thyroid

Intensity Modulated Radiation Therapy (IMRT) is appropriate for head and neck cancer **when ANY of the following conditions are met:**

- Anaplastic thyroid cancer
- To treat node-positive or node-recurrent thyroid cancer requiring external beam radiation treatment
- To treat a previously irradiated field

Stereotactic Body Radiation Therapy (SBRT) is appropriate for head and neck cancer when the following condition is met:

- Only to treat a previously irradiated field

Codes

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The following codes for treatments and procedures applicable to this document are included below for informational purposes. Inclusion or exclusion of a procedure, diagnosis or device code(s) does not constitute or imply member coverage or provider reimbursement policy. Please refer to the member's contract benefits in effect at the time of service to determine coverage or non-coverage of these services as it applies to an individual member.

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Specific CPT codes for services should be used when available. Nonspecific or not otherwise classified codes may be subject to additional documentation requirements and review.

3D Conformal

CPT/HCPCS

77295 3-dimensional radiotherapy plan, including dose-volume histograms

ICD-10 Diagnoses

Not specified

Intensity Modulated Radiation Therapy

CPT/HCPCS

77301 Intensity modulated radiation therapy plan, including dose volume histogram for target and critical structure partial tolerance specifications

77386 Intensity modulated radiation treatment delivery (IMRT), includes guidance and tracking, when performed; complex

77338 Multi-leaf collimator (MLC) device(s) for intensity modulated radiation therapy (IMRT), design and construction per IMRT plan

Stereotactic Body Radiation Therapy

CPT/HCPCS

77295 3-dimensional radiotherapy plan, including dose-volume histograms

77301	Intensity modulated radiotherapy plan, including dose-volume histograms for target and critical structure partial tolerance specifications (when specified as treatment planning for SRS or SBRT)
77338	Multi-leaf collimator (MLC) device(s) for intensity modulated radiation therapy (IMRT), design and construction per IMRT plan (when specified as devices for SRS or SBRT)
77370	Special medical radiation physics consultation
77373	Stereotactic body radiation therapy, treatment delivery, per fraction to 1 or more lesions, including image guidance, entire course not to exceed 5 fractions
77435	Stereotactic body radiation therapy, treatment management, per treatment course, to 1 or more lesions, including image guidance, entire course not to exceed 5 fractions
77470	Special treatment procedure
G0339	Image guided robotic linear accelerator-based stereotactic radiosurgery, complete course of therapy in one session or first session of fractionated treatment
G0340	Image guided robotic linear accelerator-based stereotactic radiosurgery, delivery including collimator changes and custom plugging, fractionated treatment, all lesions, per session, second through fifth sessions, maximum 5 sessions per course of treatment

Neutron Therapy

CPT/HCPCS

77423	High energy neutron radiation treatment delivery, 1 or more isocenter(s)
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Brachytherapy

CPT/HCPCS

77295	3-dimensional radiotherapy plan, including dose-volume histograms
77316	Brachytherapy isodose plan; simple (1-4 sources or 1 channel), includes basic dosimetry calculations (Do not bill 77300)
77317	Brachytherapy isodose plan; intermediate (5-10 sources or 2-12 channels), includes basic dosimetry calculation (Do not bill 77300)
77318	Brachytherapy isodose plan; complex (over 10 sources or over 12 channels), includes basic dosimetry calculations (Do not bill 77300)
77370	Special medical radiation physics consultation
77470	Special treatment procedure
77761	Intracavitary radiation source application; simple
77762	Intracavitary radiation source application; intermediate
77763	Intracavitary radiation source application; complex
77770	Remote afterloading high dose rate radionuclide interstitial or intracavitary brachytherapy, includes basic dosimetry, when performed; 1 channel
77771	Remote afterloading high dose rate radionuclide interstitial or intracavitary brachytherapy, includes basic dosimetry, when performed; 2-12 channels
77772	Remote afterloading high dose rate radionuclide interstitial or intracavitary brachytherapy, includes basic dosimetry, when performed; over 12 channels
77778	Interstitial radiation source application, complex, includes supervision, handling, loading of radiation source, when performed

All Modalities except Stereotactic Body Radiation Therapy

ICD-10 Diagnoses

**Note: Neutron therapy only applies to C07 - C08.9 and Z92.3.*

C00.0 - C00.9	Malignant neoplasm of the lip
C01 - C02.9	Malignant neoplasm of tongue
C03.0 - C03.9	Malignant neoplasm of gum
C04.0 - C04.9	Malignant neoplasm of floor of mouth
C06.0 - C06.9	Malignant neoplasm of other and unspecified parts of mouth
*C07 - C08.9	Malignant neoplasm of major salivary glands
C09.0 - C10.9	Malignant neoplasm of tonsil and oropharynx

C11.0 - C11.9 Malignant neoplasm of nasopharynx
 C13.0 - C14.8 Malignant neoplasm of hypopharynx, other and ill-defined sites in the lip, oral cavity and pharynx
 C30.0 - C31.9 Malignant neoplasm of nasal cavity, middle ear and accessory sinuses
 C32.0 - C32.9 Malignant neoplasm of larynx
 C73..... Malignant neoplasm of thyroid gland
 C76.0..... Malignant neoplasm of other and ill-defined sites of head, face and neck
 *Z92.3..... Personal history of irradiation

References

1. American Society for Radiation Oncology (ASTRO). ASTRO model policies: intensity modulated radiation therapy (IMRT). ([Updated 06-06-2019]) [18 p.]. Available from: <https://www.astro.org/Daily-Practice/Reimbursement/Model-Policies>.
2. Guimaraes, AV, Dedivitis, RA, Matos, LL, et al. Comparison between transoral laser surgery and radiotherapy in the treatment of early glottic cancer: a systematic review and meta-analysis. *Sci*. 2018;8(1):11900.
3. Guinot, JL, Arribas, L, Tortajada, MI, et al. From low-dose-rate to high-dose-rate brachytherapy in lip carcinoma: Equivalent results but fewer complications. *Brachytherapy*. 2013;12(6):528-34.
4. Gupta, T, Kannan, S, Ghosh-Laskar, S, et al. Systematic review and meta-analyses of intensity-modulated radiation therapy versus conventional two-dimensional and/or three-dimensional radiotherapy in curative-intent management of head and neck squamous cell carcinoma. *PLoS ONE*. 2018;13(7):e0200137.
5. Mohamed, ASR, Smith, BD, Smith, JB, et al. Outcomes of carotid-sparing IMRT for T1 glottic cancer: comparison with conventional radiation. *Laryngoscope*. 2019;130(1):146-53.
6. NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines®) for Head and Neck Cancers (Version 1.2020). Available at <http://www.nccn.org>. ©National Comprehensive Cancer Network, 2020
7. Patel, KB, Nichols, AC, Fung, K, et al. Treatment of early stage supraglottic squamous cell carcinoma: meta-analysis comparing primary surgery versus primary radiotherapy. *J Otolaryngol Head Neck Surg*. 2018;47(1):19.
8. Quon, H, Vapiwala, N, Forastiere, A, et al. Radiation therapy for oropharyngeal squamous cell carcinoma: American Society of Clinical Oncology endorsement of the American Society for Radiation Oncology evidence-based clinical practice guideline. *J Clin Oncol*. 2017;35(36):4078-90.
9. Rosenbluth, BD, Serrano, V, Happersett, L, et al. Intensity-modulated radiation therapy for the treatment of nonanaplastic thyroid cancer. *Int J Radiat Oncol Biol Phys*. 2005;63(5):1419-26.
10. Sher, DJ, Adelstein, DJ, Bajaj, GK, et al. Radiation therapy for oropharyngeal squamous cell carcinoma: executive summary of an ASTRO evidence-based clinical practice guideline. *Pract Radiat Oncol*. 2017;7(4):246-53.
11. Tayier, A, Hayashi, K, Yoshimura, R. Low-dose-rate interstitial brachytherapy preserves good quality of life in buccal mucosa cancer patients. *J Radiat Res (Tokyo)*. 2011;52(5):655-9.
12. Urbano, TG, Clark, CH, Hansen, VN, et al. Intensity Modulated Radiotherapy (IMRT) in locally advanced thyroid cancer: acute toxicity results of a phase I study. *Radiother Oncol*. 2007;85(1):58-63.
13. Wopken, K, Bijl, HP, Langendijk, JA. Prognostic factors for tube feeding dependence after curative (chemo-) radiation in head and neck cancer: A systematic review of literature. *Radiother Oncol*. 2018;126(1):56-67.

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Lung Cancer: Small Cell and Non-Small Cell

General Information

Commonly Used Modalities

Internal Radiation Therapy (Brachytherapy)

External Beam Radiation Therapy

- 2D or 3D conformal
- Intensity Modulated Radiation Therapy (IMRT)
- Stereotactic Body Radiation Therapy (SBRT)

Radiation Oncology Considerations

Radiation therapy has a potential role for the treatment of lung cancers in all stages of disease.

For non-small cell lung cancer, radiation may be used as an adjunct to surgery. It may also serve as definitive therapy in unresectable disease. For unresectable stage II and III disease, concurrent chemoradiotherapy is considered standard of care, when tolerated. 3D conformal radiation typically provides optimal coverage of tumor volumes. IMRT may improve dose-volume constraints, but at the expense of increasing the volume of normal tissue exposed to low doses of radiation. If normal tissue tolerances would be exceeded with 3D conformal planning, IMRT is considered medically necessary.

The optimal dose and fractionation for both definitive and palliative treatment of non-small cell lung cancer has been the subject of numerous clinical investigations. Based on several earlier phase I/II trials of dose escalation, RTOG 0617 compared standard-dose (60 Gy) with high-dose (74 Gy) conformal radiotherapy given concurrently with carboplatin and paclitaxel chemotherapy with and without the addition of cetuximab. There was no benefit from the use of cetuximab in either arm. Overall survival was better in the standard-dose arms (28.7 vs 20.3 mos, $P < .004$). Standard-dose radiotherapy also resulted in better median progression-free survival (11.8 vs 9.8 mos), lower risk of severe esophagitis (7% vs 21%; $P < .0001$) and fewer treatment-related deaths. ASTRO recently published an evidence-based clinical practice guideline which concluded that the ideal external beam dose fractionation for curative intent chemoradiotherapy for non-small cell lung cancer is 60 Gy given in 2 Gy once daily fractions over 6 weeks. Dose escalation beyond 60 Gy was not recommended outside the setting of clinical trial. This guideline has also been endorsed by ASCO. When used without concurrent chemotherapy, the guideline recommends a minimum dose of 60 Gy.

In metastatic NSCLC where palliative treatment is being considered, the goal is to strike a balance between symptom relief, local control and treatment toxicity. ASTRO published a comprehensive evidence-based guideline on palliative radiotherapy in lung cancer. The guideline concluded that higher-dose/fractionation regimens (30-Gy/10-fraction or higher) may benefit patients with good performance status. These higher dose regimens are associated with significant adverse effects such as esophagitis. Shorter course treatment is recommended for patients with poor performance status. Despite this recommendation, Koshy et al. found that almost half of stage IV lung cancer patients received inappropriately high doses of radiation (defined as more than 15 fractions). A recent update of the ASTRO guideline now supports concurrent chemoradiotherapy with a platinum doublet in stage III patients with ECOG performance status of 0-2 and a life expectancy of at least 3 months.

Stereotactic radiation may be used as definitive therapy in earlier stages of disease for patients who may not be candidates for invasive surgery. Furthermore, stereotactic radiation may be recommended for local palliation or prevention of symptoms such as hemoptysis, obstruction, or pain. There is an emerging role for SBRT to treat oligometastatic disease (3 or fewer metastatic lesions). Please refer to the Oligometastatic disease section for further discussion.

Radiation therapy is also used in all stages of small cell lung cancer, either as definitive treatment in combination with chemotherapy, or as palliative therapy. Concurrent chemotherapy is preferred to sequential chemotherapy with RT. Target volumes are best defined with pretreatment PET/CT obtained at the time of

radiotherapy planning. Consolidative thoracic radiation may be beneficial to select patients with extensive stage disease who have significant responses to standard chemotherapy.

ASTRO has published a clinical guideline on the use of radiation therapy to treat small cell lung cancer. In that guideline, there is a strong recommendation based on moderate quality evidence that inoperable patients with stage I or node negative stage II disease can be treated with either SBRT or conventionally fractionated radiotherapy.

The utility of 2D radiation is likely limited to palliative treatment of metastatic disease.

The minimum standard used to treat intrapulmonary lesions is 3D conformal, with CT planning. PET/CT is noted to significantly improve targeting accuracy. Tumor motion should be accounted for.

The clinically appropriate use of more advanced modalities, such as IMRT and SBRT, are limited to specific clinical scenarios. It is the responsibility of the Radiation practice to create optimal treatment plans when evaluating modality choices for treatment.

For review of metastatic sites, please refer to specific guidelines for the appropriate location (e.g., CNS Cancers for brain metastases and Lung Cancer for lung metastases).

Clinical Indications

2D or 3D conformal is appropriate for lung cancer when ANY of the following conditions are met:

- Primary lung cancers, for adjuvant, neoadjuvant, or definitive local treatment
- Palliation of metastatic lesions in the lung particularly symptomatic tumors requiring local control
- Prophylactic Cranial Irradiation (PCI), when indicated (see also CNS guideline)

Primary Lung Cancers

Non-Small Cell Lung Cancer

Intensity Modulated Radiation Therapy (IMRT) is appropriate for non-small cell lung cancer **when ANY of the following conditions are met:**

- For adjuvant or definitive treatment of stage I and II disease in the curative setting
 - When a 3D plan has been performed and dose-volume constraints would lead to unacceptable risk for normal lung tissue toxicity such that **(all must apply)**
 - V20 exceeds 30% with 3D conformal plan (the percent of normal tissues receiving 20 Gy or more accounts for more than 30% of normal lung)
 - The comparison of the 3D conformal plan and the IMRT plan demonstrates that the IMRT plan will reduce the V20 by 10% as compared to the 3D conformal plan
 - V5 would be less than 65% (the percent of normal tissues receiving 5 Gy or more accounts for less than 65% of normal lung) with IMRT
 - Tumor motion has been accounted for during planning
 - When a 3D plan has been performed and dose-volume constraints would lead to unacceptable risk of cardiac toxicity **(any constraint below is exceeded)**
 - More than 50% of the heart receives 30 Gy ($V_{30} > 50\%$)
 - More than 35% of the heart receives 45 Gy ($V_{45} > 35\%$)
 - More than 25% of the heart receives 50 Gy ($V_{50} > 25\%$)
- For adjuvant or definitive treatment of stage III disease in the curative setting
- To treat a previously irradiated field

Stereotactic Body Radiation Therapy (SBRT) is appropriate for non-small cell lung cancer **when ANY of the following conditions are met:**

- As an alternative to surgical resection when **(all must apply)**

- Treatment intent is cure
 - There is no evidence of nodal or distant metastases based on conventional staging techniques (Stage IA, IB, or IIA with negative lymph nodes)
- Single lesion measuring less than or equal to 5 cm
- Lesion is inoperable for **either** of the following reasons:
 - Tumor location
 - Individual is not a surgical candidate
- To treat a previously irradiated field

Endobronchial Brachytherapy is appropriate for non-small cell lung cancer **when ANY of the following conditions are met:**

- Treatment of unresectable primary bronchial tumors that cannot be addressed by standard external beam radiotherapy techniques
- Palliative treatment of obstructing endobronchial tumors

Small Cell Lung Cancer

Intensity Modulated Radiation Therapy (IMRT) is appropriate for small cell lung cancer **when ANY of the following conditions are met:**

- For definitive treatment in the curative setting
 - When a 3D plan has been performed and dose-volume constraints would lead to unacceptable risk for normal lung tissue toxicity such that **(all must apply)**
 - V20 exceeds 30% with 3D conformal plan (the percent of normal tissues receiving 20 Gy or more accounts for more than 30% of normal lung)
 - The comparison of the 3D conformal plan and the IMRT plan demonstrates that the IMRT plan will reduce the V20 by 10% as compared to the 3D conformal plan
 - V5 would be less than 65% (the percent of normal tissues receiving 5 Gy or more accounts for less than 65% of normal lung) with IMRT
 - Tumor motion has been accounted for during planning
 - When a 3D plan has been performed and dose-volume constraints would lead to unacceptable risk of cardiac toxicity **(any constraint below is exceeded)**
 - More than 50% of the heart receives 30 Gy ($V_{30} > 50\%$)
 - More than 35% of the heart receives 45 Gy ($V_{45} > 35\%$)
 - More than 25% of the heart receives 50 Gy ($V_{50} > 25\%$)
- To treat a previously irradiated field

Stereotactic Body Radiation Therapy (SBRT) is appropriate for small cell lung cancer **when ANY of the following conditions are met:**

- As an alternative to surgical resection when **(all must apply)**
 - Treatment intent is cure
 - There is no evidence of nodal or distant metastases based on conventional staging techniques (Stage IA, IB, or IIA with negative lymph nodes)
 - Single lesion measuring less than or equal to 5 cm
 - Lesion is inoperable for **either** of the following reasons
 - Tumor location
 - Individual is not a surgical candidate
- To treat a previously irradiated field

Endobronchial Brachytherapy is appropriate for small cell lung cancer **when ANY of the following conditions are met:**

- Treatment of unresectable primary bronchial tumors that cannot be addressed by standard external beam radiotherapy techniques
- Palliative treatment of obstructing endobronchial tumors

Metastatic Lesions in the Lung

Intensity Modulated Radiation Therapy (IMRT) is appropriate for metastatic lesions in the lung when the following condition is met:

- Only to treat a previously irradiated field

Stereotactic Body Radiation Therapy (SBRT) is appropriate for metastatic lesions in the lung **when EITHER of the following conditions is met:**

- To treat a metastatic lesion (**all must be met**)
 - Patient with a single metastatic lesion measuring less than 5 cm (oligometastatic disease may be considered on a case-by-case basis)
 - Individual has a good performance status
 - ECOG Scale 0, 1, or 2
 - Extrapulmonary disease is stable or volume of disease is low with remaining treatment options
 - Intent is either of the following
 - Curative
 - Palliative, with a current symptom or anticipation of a symptom (for example, lesion is close to a major vessel and without local treatment, is anticipated to lead to hemoptysis or hemorrhage)
- To treat a previously irradiated field

Note: When SRS/SBRT is being requested to treat a patient with oligometastatic disease with potentially curative intent, please refer to separate criteria in the Oligometastatic Extracranial Disease section of the Guidelines.

Endobronchial Brachytherapy is appropriate for metastatic lesions in the lung when the following condition is met:

- For palliative treatment of obstructing endobronchial tumors

Fractionation

For the treatment of stage I–III non-small cell lung cancer with concurrent chemoradiotherapy, up to 35 fractions of thoracic radiotherapy are medically necessary

For the palliative treatment of stage IV non-small cell lung cancer, up to 15 treatments of thoracic radiotherapy are medically necessary

For the curative treatment of stage IV non-small cell lung cancer in a patient with oligometastatic disease, up to 35 treatments of thoracic radiotherapy are medically necessary

Codes

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The following code list is not meant to be all-inclusive. Authorization requirements will vary by health plan. Please consult the applicable health plan for guidance on specific procedure codes.

Specific CPT codes for services should be used when available. Nonspecific or not otherwise classified codes may be subject to additional documentation requirements and review.

3D Conformal

CPT/HCPCS

77295	3-dimensional radiotherapy plan, including dose-volume histograms
77402	Radiation treatment delivery, > 1 MeV; simple.
77407	Radiation treatment delivery, > 1 MeV; intermediate.
77412	Radiation treatment delivery, > 1 MeV; complex
G6003	Radiation treatment delivery, single treatment area, single port or parallel opposed ports, simple blocks or no blocks: up to 5 MeV
G6004	Radiation treatment delivery, single treatment area, single port or parallel opposed ports, simple blocks or no blocks: 6-10 MeV
G6005	Radiation treatment delivery, single treatment area, single port or parallel opposed ports, simple blocks or no blocks: 11-19 MeV
G6006	Radiation treatment delivery, single treatment area, single port or parallel opposed ports, simple blocks or no blocks: 20 MeV or greater
G6007	Radiation treatment delivery, 2 separate treatment areas, 3 or more ports on a single treatment area, use of multiple blocks: up to 5 MeV
G6008	Radiation treatment delivery, 2 separate treatment areas, 3 or more ports on a single treatment area, use of multiple blocks: 6-10 MeV
G6009	Radiation treatment delivery, 2 separate treatment areas, 3 or more ports on a single treatment area, use of multiple blocks: 11-19 MeV
G6010	Radiation treatment delivery, 2 separate treatment areas, 3 or more ports on a single treatment area, use of multiple blocks: 20 MeV or greater
G6011	Radiation treatment delivery, 3 or more separate treatment areas, custom blocking, tangential ports, wedges, rotational beam, compensators, electron beam; up to 5 MeV
G6012	Radiation treatment delivery, 3 or more separate treatment areas, custom blocking, tangential ports, wedges, rotational beam, compensators, electron beam; 6-10 MeV
G6013	Radiation treatment delivery, 3 or more separate treatment areas, custom blocking, tangential ports, wedges, rotational beam, compensators, electron beam; 11-19 MeV
G6014	Radiation treatment delivery, 3 or more separate treatment areas, custom blocking, tangential ports, wedges, rotational beam, compensators, electron beam; 20 MeV or greater

ICD-10 Diagnoses

C34.00 - C34.92 ... Malignant neoplasm of bronchus and lung

C78.00 - C78.02 ... Secondary malignant neoplasm of lung

Intensity Modulated Radiation Therapy

CPT/HCPCS

77301	Intensity modulated radiotherapy plan, including dose-volume histograms for target and critical structure partial tolerance specifications
77338	Multi-leaf collimator (MLC) device(s) for intensity modulated radiation therapy (IMRT), design and construction per IMRT plan
77386	Intensity modulated radiation treatment delivery (IMRT), includes guidance and tracking, when performed; complex

- G6015 Intensity modulated treatment delivery, single or multiple fields/arcs, via narrow spatially and temporally modulated beams, binary, dynamic MLC, per treatment session
- G6016 Compensator-based beam modulation treatment delivery of inverse planned treatment using 3 or more high resolution (milled or cast) compensator, convergent beam modulated fields, per treatment session

ICD-10 Diagnoses

C34.00 - C34.92 ... Malignant neoplasm of bronchus and lung

C78.00 - C78.02 ... Secondary malignant neoplasm of lung

Stereotactic Body Radiation Therapy

CPT/HCPCS

- 32701 Thoracic target(s) delineation for stereotactic body radiation therapy (SRS/SBRT)
- 77295 3-dimensional radiotherapy plan, including dose-volume histograms
- 77301 Intensity modulated radiation therapy plan, including dose volume histogram for target and critical structure partial tolerance specifications (when specified as treatment planning for SRS or SBRT)
- 77338 Multi-leaf collimator (MLC) device(s) for intensity modulated radiation therapy (IMRT), design and construction per IMRT plan (when specified as devices for SRS or SBRT)
- 77370 Special medical radiation physics consultation
- 77373 Stereotactic body radiation therapy, treatment delivery, per fraction to 1 or more lesions, including image guidance, entire course not to exceed 5 fractions
- 77435 Stereotactic body radiation therapy, treatment management, per treatment course, to 1 or more lesions, including image guidance, entire course not to exceed 5 fractions
- 77470 Special treatment procedure
- G0339 Image guided robotic linear accelerator-based stereotactic radiosurgery, complete course of therapy in one session or first session of fractionated treatment
- G0340 Image guided robotic linear accelerator-based stereotactic radiosurgery, delivery including collimator changes and custom plugging, fractionated treatment, all lesions, per session, second through fifth sessions, maximum 5 sessions per course of treatment

ICD-10 Diagnoses

C34.00 - C34.92 ... Malignant neoplasm of bronchus and lung

C78.00 - C78.02 ... Secondary malignant neoplasm of lung

D02.20 - D02.22 ... Carcinoma in situ bronchus and lung

Z51.5 Encounter for palliative care

Z53.09 Surgery contraindicated

Z92.3 Personal history of irradiation

Brachytherapy

CPT/HCPCS

- 31643 Bronchoscopy, rigid or flexible, including fluoroscopic guidance, when performed; with placement of catheter(s) for intracavitary radioelement application
- 77295 3-dimensional radiotherapy plan, including dose-volume histograms
- 77316 Brachytherapy isodose plan; simple (1-4 sources or 1 channel), includes basic dosimetry calculations (Do not bill 77300)
- 77317 Brachytherapy isodose plan; intermediate (5-10 sources or 2-12 channels), includes basic dosimetry calculation (Do not bill 77300)
- 77318 Brachytherapy isodose plan; complex (over 10 sources or over 12 channels), includes basic dosimetry calculations (Do not bill 77300)
- 77370 Special medical radiation physics consultation
- 77470 Special treatment procedure
- 77761 Intracavitary radiation source application; simple
- 77762 Intracavitary radiation source application; intermediate
- 77763 Intracavitary radiation source application; complex
- 77770 Remote afterloading high dose rate radionuclide interstitial or intracavitary brachytherapy, includes basic dosimetry, when performed; 1 channel

77771 Remote afterloading high dose rate radionuclide interstitial or intracavitary brachytherapy, includes basic dosimetry, when performed; 2-12 channels

ICD-10 Diagnoses

C34.00 - C34. Malignant neoplasm of bronchus and lung

C78.00 - C78.02 ... Secondary malignant neoplasm of lung

Z51.5 Encounter for palliative care

References

1. American Society for Radiation Oncology (ASTRO). ASTRO model policies: intensity modulated radiation therapy (IMRT). ([Updated 06-06-2019]) [18 p.]. Available from: <https://www.astro.org/Daily-Practice/Reimbursement/Model-Policies>.
2. Berlin, E, Buckstein, M, Yip, R, et al. Definitive radiation for stage I lung cancer in a screened population: results from the I-ELCAP. *Int J Radiat Oncol Biol Phys*. 2019;104(1):122-6.
3. Bezjak, A, Rumble, RB, Rodrigues, G, et al. Intensity-modulated radiotherapy in the treatment of lung cancer. *Clin Oncol (R Coll Radiol)*. 2012;24(7):508-20.
4. Bezjak, A, Temin, S, Franklin, G, et al. Definitive and Adjuvant radiotherapy in locally advanced non-small-cell lung cancer: American Society of Clinical Oncology clinical practice guideline endorsement of the American Society for Radiation Oncology evidence-based clinical practice guideline. *J Clin Oncol*. 2015;33(18):2100-5.
5. Bradley, JD, Paulus, R, Komaki, R, et al. Standard-dose versus high-dose conformal radiotherapy with concurrent and consolidation carboplatin plus paclitaxel with or without cetuximab for patients with stage IIIA or IIIB non-small-cell lung cancer (RTOG 0617): a randomised, two-by-two factorial phase 3 study. *Lancet Oncol*. 2015;16(2):187-99.
6. Brooks, ED, Sun, B, Zhao, L, et al. Stereotactic ablative radiation therapy is highly safe and effective for elderly patients with early-stage non-small cell lung cancer. *Int J Radiat Oncol Biol Phys*. 2017;98(4):900-7.
7. Cao, C, Wang, D, Chung, C, et al. A systematic review and meta-analysis of stereotactic body radiation therapy versus surgery for patients with non-small cell lung cancer. *J Thorac Cardiovasc Surg*. 2019;157(1):362-73.e8.
8. Chen, H, Laba, JM, Boldt, RG, et al. Stereotactic ablative radiation therapy versus surgery in early lung cancer: a meta-analysis of propensity score studies. *Int J Radiat Oncol Biol Phys*. 2018;101(1):186-94.
9. Chun, SG, Hu, C, Choy, H, et al. Impact of intensity-modulated radiation therapy technique for locally advanced non-small-cell lung cancer: a secondary analysis of the NRG Oncology RTOG 0617 randomized clinical trial. *J Clin Oncol*. 2017;35(1):56-62.
10. Holloway, CL, Delaney, TF, Alektiar, KM, et al. American Brachytherapy Society (ABS) consensus statement for sarcoma brachytherapy. *Brachytherapy*. 2013;12(3):179-90.
11. Jegadeesh, N, Liu, Y, Gillespie, T, et al. Evaluating intensity-modulated radiation therapy in locally advanced non-small-cell lung cancer: results from the national cancer data base. *Clin Lung Cancer*. 2016;17(5):398-405.
12. Koshy, M, Malik, R, Mahmood, U, et al. Prevalence and predictors of inappropriate delivery of palliative thoracic radiotherapy for metastatic lung cancer. *J Natl Cancer Inst*. 2015;107(12):djv278.
13. Li, C, Xiong, Y, Zhou, Z, et al. Stereotactic body radiotherapy with concurrent chemotherapy extends survival of patients with limited stage small cell lung cancer: a single-center prospective phase II study. *Med Oncol*. 2014;31(12):369.
14. Liao, ZX, Komaki, RR, Thames, HD, Jr., et al. Influence of technologic advances on outcomes in patients with unresectable, locally advanced non-small-cell lung cancer receiving concomitant chemoradiotherapy. *Int J Radiat Oncol Biol Phys*. 2010;76(3):775-81.
15. Moeller, B, Balagamwala, EH, Chen, A, et al. Palliative thoracic radiation therapy for non-small cell lung cancer: 2018 update of an American Society for Radiation Oncology (ASTRO) evidence-based guideline. *Pract Radiat Oncol*. 2018;8(4):245-50.
16. NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines®) for Non-Small Cell Lung Cancer (Version 4.2020). Available at <http://www.nccn.org>. ©National Comprehensive Cancer Network, 2020
17. Rodrigues, G, Choy, H, Bradley, J, et al. Adjuvant radiation therapy in locally advanced non-small cell lung cancer: Executive summary of an American Society for Radiation Oncology (ASTRO) evidence-based clinical practice guideline. *Pract Radiat Oncol*. 2015;5(3):149-55.
18. Rodrigues, G, Choy, H, Bradley, J, et al. Definitive radiation therapy in locally advanced non-small cell lung cancer: executive summary of an American Society for Radiation Oncology (ASTRO) evidence-based clinical practice guideline. *Pract Radiat Oncol*. 2015;5(3):141-8.
19. Schneider, BJ, Daly, ME, Kennedy, EB, et al. Stereotactic body radiotherapy for early-stage non-small-cell lung cancer: American Society of Clinical Oncology endorsement of the American Society for Radiation Oncology evidence-based guideline summary. *J Oncol Pract*. 2018;14(3):180-6.
20. Simone, CB, 2nd, Bogart, JA, Cabrera, AR, et al. Radiation therapy for small cell lung cancer: an ASTRO clinical practice guideline. *Pract Radiat Oncol*. 2020;10(3):158-73.
21. Speirs, CK, DeWees, TA, Rehman, S, et al. Heart dose is an independent dosimetric predictor of overall survival in locally advanced non-small cell lung cancer. *Journal of Thoracic Oncology*. 2017;12(2):293-301.

22. Verma, V, Simone, CB, 2nd, Allen, PK, et al. Multi-institutional experience of stereotactic ablative radiation therapy for stage I small cell lung cancer. *Int J Radiat Oncol Biol Phys.* 2017;97(2):362-71.
23. Videtic, GM, Paulus, R, Singh, AK, et al. Long-term follow-up on NRG Oncology RTOG 0915 (NCCTG N0927): a randomized phase 2 study comparing 2 stereotactic body radiation therapy schedules for medically inoperable patients with stage I peripheral non-small cell lung cancer. *Int J Radiat Oncol Biol Phys.* 2019;103(5):1077-84.
24. Videtic, GMM, Donington, J, Giuliani, M, et al. Stereotactic body radiation therapy for early-stage non-small cell lung cancer: executive summary of an ASTRO evidence-based guideline. *Pract Radiat Oncol.* 2017;7(5):295-301.
25. Wang, S, Wang, X, Zhou, Q, et al. Stereotactic ablative radiotherapy versus lobectomy for stage I non-small cell lung cancer: a systematic review. *Thorac Cancer.* 2018;9(3):337-47.
26. Yom, SS, Liao, Z, Liu, HH, et al. Initial evaluation of treatment-related pneumonitis in advanced-stage non-small-cell lung cancer patients treated with concurrent chemotherapy and intensity-modulated radiotherapy. *Int J Radiat Oncol Biol Phys.* 2007;68(1):94-102.

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These Guidelines are a work in progress that may be refined as often as new significant data becomes available.

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Lymphoma: Hodgkin and Non-Hodgkin

General Information

Commonly Used Modalities

External Beam Radiation Therapy

- 2D or 3D conformal
- Intensity Modulated Radiation Therapy (IMRT)
- Stereotactic Body Radiation Therapy (SBRT)
- Stereotactic Radiosurgery (SRS)

Radiation Oncology Considerations

Hodgkin Lymphoma

Hodgkin lymphoma is a malignancy of the lymphatic system with distinct clinical and pathologic features which set it apart from Non-Hodgkin lymphoma. The disease commonly affects lymph nodes in the mediastinum but can affect nodes and other lymphatic organs throughout the body. Occasionally, the bone marrow and liver are also involved. Pathologically, Hodgkin lymphoma is characterized by the presence of characteristic lymphocytes called Reed-Sternberg cells.

There are four distinct subtypes of Hodgkin lymphoma. About 80% of cases are termed nodular sclerosis Hodgkin lymphoma. The other types include lymphocyte-predominant, mixed cellularity and lymphocyte-depleted Hodgkin lymphoma. Over the years, treatment has evolved from radiotherapy or chemotherapy alone to a risk adapted approach of chemotherapy and involved site radiotherapy. Treatment intensity is also guided by treatment response on PET scan performed after multiple cycles of chemotherapy.

For favorable stage I and II disease, 20-30 Gy of involved site radiotherapy is given after chemotherapy. For bulky disease at presentation, doses of 30-36 Gy are appropriate. Although these doses are generally below the dose tolerance of the surrounding normal tissues, there are situations where advanced planning techniques are likely to result in a meaningful decrease in late toxicity from radiotherapy. Koeck et al. published a planning comparison of 3D vs IMRT for patients with unfavorable mediastinal Hodgkin lymphoma and found reduced mean heart and spinal cord doses with IMRT. Doses to the lungs and breasts were higher with 3D conformal radiation. The most pronounced benefits were seen in patients with lymph nodes anterior to the heart. Since IMRT has been shown to increase low dose exposure to the breasts and lungs, the potential benefit of cardiac sparing needs to be weighed against increased risks of breast and lung cancer, especially in female patients. The role of IMRT in the treatment of non-mediastinal Hodgkin lymphoma has not been studied and therefore IMRT in these cases is considered not medically necessary.

Non-Hodgkin Lymphoma

Non-Hodgkin lymphoma (NHL) is a cancer arising in lymphocytes and includes all subtypes except Hodgkin lymphoma (described below). The disease most commonly involved B-cells but can involve other types of lymphocytes. Historically, lymphomas have been grouped based on histology into low grade, intermediate grade and high grade. Advances in tumor phenotyping has allowed more sophisticated subtyping to guide treatment.

Specific treatment depends on the grade and extent of disease. Treatments may include chemotherapy, immunotherapy or other targeted therapy, radiation therapy and stem cell transplantation. Some asymptomatic follicular (low grade) lymphomas may not require active treatment. In other cases, involved site radiotherapy alone or in combination with systemic therapy is used. Doses range from 20-36 Gy. Stage I and II diffuse large B-cell lymphoma is typically treated with combined chemotherapy and radiotherapy. The dose to the involved site is guided by the response to 3-6 cycles of R-CHOP chemotherapy. Doses of 30-36 Gy are given to consolidate complete responses while doses of 40-50 Gy are used to treat partial responses. Radiotherapy is also applied to bulky sites of involvement after chemotherapy in stage III and IV lymphoma. Lymphoma

including mucosal associated (MALT) lymphomas, mantle cell lymphoma, Burkitt's lymphoma and others may involve radiotherapy with doses up to 45 Gy as part of the treatment.

Because the doses of radiation needed for non-Hodgkin lymphoma are lower than doses used for most other types of cancer, the need for advanced planning techniques such as intensity modulated radiation therapy (IMRT) is limited. As with Hodgkin lymphoma, IMRT is appropriate for mediastinal disease due to the proximity of the target to sensitive normal structures. For other sites, there are limited data regarding IMRT and therefore it is considered not medically necessary.

Clinical Indications

2D or 3D conformal

2D or 3D conformal is appropriate for Hodgkin and non-Hodgkin lymphoma **when ANY of the following conditions are met:**

- Primary therapy
- Consolidative treatment after chemotherapy

Intensity Modulated Radiation Therapy (IMRT)

Intensity Modulated Radiation Therapy (IMRT) is appropriate for Hodgkin and non-Hodgkin lymphoma **when ANY of the following conditions are met:**

- Hodgkin lymphoma involving the mediastinum
- Non-Hodgkin lymphoma involving the mediastinum
- Lymphomas of the head and neck region (see Head and Neck section)

Stereotactic Body Radiation Therapy (SBRT) or Stereotactic Radiosurgery (SRS)

Stereotactic Body Radiation Therapy (SBRT) or Stereotactic Radiosurgery (SRS) is appropriate for Hodgkin and non-Hodgkin lymphoma when the following condition is met:

- To treat a previously irradiated field

Codes

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3D Conformal

CPT/HCPCS

77295 3-dimensional radiotherapy plan, including dose-volume histograms

ICD-10 Diagnoses

Not specified

Intensity Modulated Radiation Therapy

CPT/HCPCS

77301	Intensity modulated radiotherapy plan, including dose-volume histograms for target and critical structure partial tolerance specifications
77338	Multi-leaf collimator (MLC) device(s) for intensity modulated radiation therapy (IMRT), design and construction per IMRT plan
77386	Intensity modulated radiation treatment delivery (IMRT), includes guidance and tracking, when performed; complex
G6015	Intensity modulated treatment delivery, single or multiple fields/arcs, via narrow spatially and temporally modulated beams, binary, dynamic MLC, per treatment session
G6016	Compensator-based beam modulation treatment delivery of inverse planned treatment using 3 or more high resolution (milled or cast) compensator, convergent beam modulated fields, per treatment session

ICD-10 Diagnoses

Hodgkin lymphoma, intrathoracic lymph nodes

C81.02.....	Nodular lymphocyte predominant Hodgkin lymphoma, intrathoracic lymph nodes
C81.12.....	Nodular sclerosis Hodgkin lymphoma, intrathoracic lymph nodes
C81.22.....	Mixed cellularity Hodgkin lymphoma, intrathoracic lymph nodes
C81.32.....	Lymphocyte depleted Hodgkin lymphoma, intrathoracic lymph nodes
C81.42.....	Lymphocyte-rich Hodgkin lymphoma, intrathoracic lymph nodes
C81.72.....	Other Hodgkin lymphoma, intrathoracic lymph nodes
C81.92.....	Hodgkin lymphoma, unspecified, intrathoracic lymph nodes

Follicular lymphoma, intrathoracic lymph nodes

C82.02.....	Follicular lymphoma grade I, intrathoracic lymph nodes
C82.12.....	Follicular lymphoma grade II, intrathoracic lymph nodes
C82.22.....	Follicular lymphoma grade III, unspecified, intrathoracic lymph nodes
C82.32.....	Follicular lymphoma grade IIIa, intrathoracic lymph nodes
C82.42.....	Follicular lymphoma grade IIIb, intrathoracic lymph nodes
C82.52.....	Diffuse follicle center lymphoma, intrathoracic lymph nodes
C82.62.....	Cutaneous follicle center lymphoma, intrathoracic lymph nodes
C82.82.....	Other types of follicular lymphoma, intrathoracic lymph nodes
C82.92.....	Follicular lymphoma, unspecified, intrathoracic lymph nodes

Non-follicular lymphoma, intrathoracic lymph nodes

C83.02.....	Small cell B-cell lymphoma, intrathoracic lymph nodes
C83.12.....	Mantle cell lymphoma, intrathoracic lymph nodes
C83.32.....	Diffuse large B-cell lymphoma, intrathoracic lymph nodes
C83.52.....	Lymphoblastic (diffuse) lymphoma, intrathoracic lymph nodes
C83.72.....	Burkitt lymphoma, intrathoracic lymph nodes
C83.82.....	Other non-follicular lymphoma, intrathoracic lymph nodes
C83.92.....	Non-follicular (diffuse) lymphoma, unspecified, intrathoracic lymph nodes

Other lymphomas, intrathoracic lymph nodes

C84.02.....	Mycosis fungoides, intrathoracic lymph nodes
C84.12.....	Sézary disease, intrathoracic lymph nodes
C84.42.....	Peripheral T-cell lymphoma, not classified, intrathoracic lymph nodes
C84.62.....	Anaplastic large cell lymphoma, ALK-positive, intrathoracic lymph nodes
C84.72.....	Anaplastic large cell lymphoma, ALK-negative, intrathoracic lymph nodes
C84.92.....	Mature T/NK-cell lymphomas, unspecified, intrathoracic lymph nodes
C84.A2	Cutaneous T-cell lymphoma, unspecified, intrathoracic lymph nodes
C84.Z2	Other mature T/NK-cell lymphomas, intrathoracic lymph nodes
C85.12.....	Unspecified B-cell lymphoma, intrathoracic lymph nodes
C85.22.....	Mediastinal (thymic) large B-cell lymphoma, intrathoracic lymph nodes

C85.82..... Other specified types of non-Hodgkin lymphoma, intrathoracic lymph nodes

C85.92..... Non-Hodgkin lymphoma, unspecified, intrathoracic lymph nodes

Stereotactic Body Radiation Therapy

CPT/HCPCS

- 77295 3-dimensional radiotherapy plan, including dose-volume histograms
- 77301 Intensity modulated radiation therapy plan, including dose volume histogram for target and critical structure partial tolerance specifications (when specified as treatment planning for SRS or SBRT)
- 77338 Multi-leaf collimator (MLC) device(s) for intensity modulated radiation therapy (IMRT), design and construction per IMRT plan (when specified as devices for SRS or SBRT)
- 77370 Special medical radiation physics consultation
- 77373 Stereotactic body radiation therapy, treatment delivery, per fraction to 1 or more lesions, including image guidance, entire course not to exceed 5 fractions
- 77435 Stereotactic body radiation therapy, treatment management, per treatment course, to 1 or more lesions, including image guidance, entire course not to exceed 5 fractions
- 77470 Special treatment procedure
- G0339 Image guided robotic linear accelerator-based stereotactic radiosurgery, complete course of therapy in one session or first session of fractionated treatment
- G0340 Image guided robotic linear accelerator-based stereotactic radiosurgery, delivery including collimator changes and custom plugging, fractionated treatment, all lesions, per session, second through fifth sessions, maximum 5 sessions per course of treatment

ICD-10 Diagnoses

Z92.3..... Personal history of irradiation

Stereotactic Radiosurgery

CPT/HCPCS

- 77295 3-dimensional radiotherapy plan, including dose-volume histograms
- 77301 Intensity modulated radiation therapy plan, including dose volume histogram for target and critical structure partial tolerance specifications (when specified as treatment planning for SRS or SBRT)
- 77338 Multi-leaf collimator (MLC) device(s) for intensity modulated radiation therapy (IMRT), design and construction per IMRT plan (when specified as devices for SRS or SBRT)
- 77370 Special medical radiation physics consultation
- 77371 Radiation treatment delivery, stereotactic radiosurgery (SRS) complete course of treatment of cranial lesion(s) consisting of 1 session; multi-source Cobalt 60 based
- 77372 Radiation treatment delivery, stereotactic radiosurgery (SRS) complete course of treatment of cranial lesion(s) consisting of 1 session; linear accelerator based
- 77432 Stereotactic radiation treatment management of cranial lesion(s) (complete course of treatment consisting of 1 session)
- G0339 Image guided robotic linear accelerator-based stereotactic radiosurgery, complete course of therapy in one session or first session of fractionated treatment
- G0340 Image guided robotic linear accelerator-based stereotactic radiosurgery, delivery including collimator changes and custom plugging, fractionated treatment, all lesions, per session, second through fifth sessions, maximum 5 sessions per course of treatment

ICD-10 Diagnoses

Z92.3..... Personal history of irradiation

References

1. American Society for Radiation Oncology (ASTRO). Image guided radiation therapy (IGRT) coding guidance [Internet] [cited 2020 Aug 14]. Available from: <https://www.astro.org/Daily-Practice/Coding/Coding-Guidance/Coding-Guidance-Articles/IGRT-in-2016>.
2. Ballonoff, A, Rusthoven, KE, Schwer, A, et al. Outcomes and effect of radiotherapy in patients with stage I or II diffuse large B-cell lymphoma: a surveillance, epidemiology, and end results analysis. *Int J Radiat Oncol Biol Phys*. 2008;72(5):1465-71.
3. Borchmann, P, Haverkamp, H, Diehl, V, et al. Eight cycles of escalated-dose BEACOPP compared with four cycles of escalated-dose BEACOPP followed by four cycles of baseline-dose BEACOPP with or without radiotherapy in patients with

- advanced-stage Hodgkin's lymphoma: final analysis of the HD12 trial of the German Hodgkin Study Group. *J Clin Oncol*. 2011;29(32):4234-42.
4. Eich, HT, Diehl, V, Gorgen, H, et al. Intensified chemotherapy and dose-reduced involved-field radiotherapy in patients with early unfavorable Hodgkin's lymphoma: final analysis of the German Hodgkin Study Group HD11 trial. *J Clin Oncol*. 2010;28(27):4199-206.
 5. Engert, A, Diehl, V, Franklin, J, et al. Escalated-dose BEACOPP in the treatment of patients with advanced-stage Hodgkin's lymphoma: 10 years of follow-up of the GHSG HD9 study. *J Clin Oncol*. 2009;27(27):4548-54.
 6. Engert, A, Franklin, J, Eich, HT, et al. Two cycles of doxorubicin, bleomycin, vinblastine, and dacarbazine plus extended-field radiotherapy is superior to radiotherapy alone in early favorable Hodgkin's lymphoma: final results of the GHSG HD7 trial. *J Clin Oncol*. 2007;25(23):3495-502.
 7. Engert, A, Schiller, P, Josting, A, et al. Involved-field radiotherapy is equally effective and less toxic compared with extended-field radiotherapy after four cycles of chemotherapy in patients with early-stage unfavorable Hodgkin's lymphoma: results of the HD8 trial of the German Hodgkin's Lymphoma Study Group. *J Clin Oncol*. 2003;21(19):3601-8.
 8. Hoppe, RT. Hodgkin's lymphoma: the role of radiation in the modern combined strategies of treatment. *Hematol Oncol Clin North Am*. 2007;21(5):915-27.
 9. Horning, SJ, Weller, E, Kim, K, et al. Chemotherapy with or without radiotherapy in limited-stage diffuse aggressive non-Hodgkin's lymphoma: Eastern Cooperative Oncology Group study 1484. *J Clin Oncol*. 2004;22(15):3032-8.
 10. Illidge, T, Specht, L, Yahalom, J, et al. Modern radiation therapy for nodal non-Hodgkin lymphoma-target definition and dose guidelines from the International Lymphoma Radiation Oncology Group. *Int J Radiat Oncol Biol Phys*. 2014;89(1):49-58.
 11. Johnson, PW, Sydes, MR, Hancock, BW, et al. Consolidation radiotherapy in patients with advanced Hodgkin's lymphoma: survival data from the UKLG LY09 randomized controlled trial (ISRCTN97144519). *J Clin Oncol*. 2010;28(20):3352-9.
 12. Koeck, J, Abo-Madyan, Y, Lohr, F, et al. Radiotherapy for early mediastinal Hodgkin lymphoma according to the German Hodgkin Study Group (GHSG): the roles of intensity-modulated radiotherapy and involved-node radiotherapy. *Int J Radiat Oncol Biol Phys*. 2012;83(1):268-76.
 13. Meyer, RM, Gospodarowicz, MK, Connors, JM, et al. Randomized comparison of ABVD chemotherapy with a strategy that includes radiation therapy in patients with limited-stage Hodgkin's lymphoma: National Cancer Institute of Canada Clinical Trials Group and the Eastern Cooperative Oncology Group. *J Clin Oncol*. 2005;23(21):4634-42.
 14. Miller, TP, Dahlberg, S, Cassady, JR, et al. Chemotherapy alone compared with chemotherapy plus radiotherapy for localized intermediate- and high-grade non-Hodgkin's lymphoma. *N Engl J Med*. 1998;339(1):21-6.
 15. Ng, AK, Yahalom, J, Goda, JS, et al. Role of radiation therapy in patients with relapsed/refractory diffuse large b-cell lymphoma: guidelines from the International Lymphoma Radiation Oncology Group. *Int J Radiat Oncol Biol Phys*. 2018;100(3):652-69.
 16. Phan, J, Mazloom, A, Medeiros, LJ, et al. Benefit of consolidative radiation therapy in patients with diffuse large B-cell lymphoma treated with R-CHOP chemotherapy. *J Clin Oncol*. 2010;28(27):4170-6.
 17. Schellong, G, Riepenhausen, M, Bruch, C, et al. Late valvular and other cardiac diseases after different doses of mediastinal radiotherapy for Hodgkin disease in children and adolescents: report from the longitudinal GPOH follow-up project of the German-Austrian DAL-HD studies. *Pediatr Blood Cancer*. 2010;55(6):1145-52.
 18. Shenkier, TN, Voss, N, Fahey, R, et al. Brief chemotherapy and involved-region irradiation for limited-stage diffuse large-cell lymphoma: an 18-year experience from the British Columbia Cancer Agency. *J Clin Oncol*. 2002;20(1):197-204.
 19. Specht, L, Yahalom, J, Illidge, T, et al. Modern radiation therapy for Hodgkin lymphoma: field and dose guidelines from the international lymphoma radiation oncology group (ILROG). *Int J Radiat Oncol Biol Phys*. 2014;89(4):854-62.
 20. Straus, DJ, Portlock, CS, Qin, J, et al. Results of a prospective randomized clinical trial of doxorubicin, bleomycin, vinblastine, and dacarbazine (ABVD) followed by radiation therapy (RT) versus ABVD alone for stages I, II, and IIIA nonbulky Hodgkin disease. *Blood*. 2004;104(12):3483-9.
 21. Weber, DC, Johanson, S, Peguret, N, et al. Predicted risk of radiation-induced cancers after involved field and involved node radiotherapy with or without intensity modulation for early-stage Hodgkin lymphoma in female patients. *Int J Radiat Oncol Biol Phys*. 2011;81(2):490-7.

Oligometastatic Extracranial Disease

General Information

Radiation Oncology Considerations

Metastasis can occur when one or more cancer cells develop the capacity to enter the bloodstream and establish secondary tumors in distant organs such as the brain, lungs, liver and bone. While widespread metastatic disease is generally considered incurable, there exists a subset of patients with limited metastatic involvement who can potentially be cured of their disease. This state has been termed “oligometastatic” and is most commonly defined as having 3 or fewer metastatic lesions. In the past, aggressive metastasis-directed therapy largely consisted of surgical resection of lung and liver lesions. Radiotherapy was generally reserved for palliation of symptoms. Advances in system therapy and the widespread availability of stereotactic body radiation therapy have renewed interest in ablative therapy for oligometastatic disease.

Much of the data on treatment of oligometastatic cancer consist of single institution retrospective reviews. Several series have shown long-term benefit from resection of limited liver metastases in patients with colorectal cancer. Five-year disease-free survival rates approach 30% in this setting. Similarly, radiofrequency ablation of limited hepatic metastases from colorectal cancer has been shown to improve survival. A phase II randomized EORTC trial studied the addition of radiofrequency ablation to standard systemic therapy in 119 patients without extrahepatic disease. Ruers et al. recently reported an 8-year overall survival rate of 36% for patients randomized to radiofrequency ablation of liver lesions compared to 9% for patients receiving systemic therapy alone.

Stereotactic body radiation therapy (SBRT), also termed stereotactic ablative radiation therapy (SABR), has also been studied in the treatment of oligometastatic cancer. Control rates with this ablative technology approach 90%. Several prospective phase II studies have examined the potential benefit of SABR in oligometastatic disease. Gomez et al. reported results of a multi-institutional phase II randomized study of local consolidative therapy (LCT) vs maintenance therapy or observation. Patients with non-small cell lung cancer and 1-3 metastatic lesions were eligible for randomization only if disease had not progressed on chemotherapy. The study was stopped early due to a significant improvement in progression-free survival with LCT (11.9 months) vs maintenance only (3.9 mos) yielding a hazard ratio of 0.35 ($P < .005$). Iyengar et al. studied whether consolidative radiotherapy to the primary and up to 5 metastatic lesions would improve disease-free survival in NSCLC compared to maintenance chemotherapy alone. Twenty-nine patients were randomized. Disease-free survival in SABR-treated patients was 9.7 months compared to 3.5 months in the maintenance group ($P < .01$).

In a single-arm phase II study of SABR in 147 patients with up to 5 metastatic lesions, Suter et al. report a 5-year overall survival rate of 43%. In addition to lung cancer, they treated colorectal, head and neck, breast, and prostate cancers among others. Although they allowed up to 5 metastatic lesions, 96.5% of patients had 3 or fewer lesions. On multivariate analysis, patients with a Karnofsky Performance Status (KPS) of 80 or less was associated with worse survival.

The phase II STOMP trial randomized men with castration-sensitive, oligometastatic prostate cancer recurrence to either ablative metastasis-directed therapy (MDT) or surveillance. There were 62 patients studied using androgen deprivation therapy (ADT)-free survival as the primary endpoint. Up to 3 metastatic lesions were allowed in either nodal or non-nodal sites and MDT included either surgery or SABR. At a median follow-up of 3 years, MDT resulted in a median ADT-free survival of 21 months vs 13 months with surveillance (HR 0.6, $P = .11$). Quality of life was similar in both groups at baseline, 3 months, and one year.

Initial results of the randomized SABR-COMET (NCT01446744) trial were recently reported. This randomized trial compared overall survival in patients with a controlled primary cancer and up to 5 metastatic lesions treated with either SABR to all oligometastatic lesions or palliative standard of care (SOC). Eligible patients had EGOC PS 0-1 and an estimated life expectancy of at least 6 months. A total of 99 patients were treated using a 1:2 ratio of SOC vs SABR. The most commonly treated primary cancer types included breast, colorectal, lung, and prostate. Although up to 5 oligometastatic lesions were allowed, 93% had 1-3 metastases. Overall survival for the SABR-treated patients averaged 41 months vs 28 months seen with palliative SOC ($P = .09$). Median progression-free survival rates were 12 months and 6 months, respectively ($P = .001$). Compared with SOC, treatment with SBRT was not associated with decreased quality of life.

Clinical Indications

Stereotactic Body Radiation Therapy (SBRT) is medically necessary for extracranial oligometastatic disease when ALL of the following conditions are met:

- One (1) to three (3) metastatic lesions involving the lungs, liver, or bone
- Primary tumor is breast, colorectal, melanoma, non-small cell lung, prostate, renal cell, or sarcoma
- Primary tumor is controlled
- No prior history of metastatic disease
- Good performance status
 - ECOG 0, 1, or 2

Codes

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The following code list is not meant to be all-inclusive. Authorization requirements will vary by health plan. Please consult the applicable health plan for guidance on specific procedure codes.

Specific CPT codes for services should be used when available. Nonspecific or not otherwise classified codes may be subject to additional documentation requirements and review.

Stereotactic Body Radiation Therapy

CPT/HCPCS

77295	.....	3-dimensional radiotherapy plan, including dose-volume histograms
77301	.....	Intensity modulated radiation therapy plan, including dose volume histogram for target and critical structure partial tolerance specifications (when specified as treatment planning for SRS or SBRT)
77338	.....	Multi-leaf collimator (MLC) device(s) for intensity modulated radiation therapy (IMRT), design and construction per IMRT plan (when specified as devices for SRS or SBRT)
77370	.....	Special medical radiation physics consultation
77373	.....	Stereotactic body radiation therapy, treatment delivery, per fraction to 1 or more lesions, including image guidance, entire course not to exceed 5 fractions
77435	.....	Stereotactic body radiation therapy, treatment management, per treatment course, to 1 or more lesions, including image guidance, entire course not to exceed 5 fractions
77470	.....	Special treatment procedure
G0339	.....	Image guided robotic linear accelerator-based stereotactic radiosurgery, complete course of therapy in one session or first session of fractionated treatment
G0340	.....	Image guided robotic linear accelerator-based stereotactic radiosurgery, delivery including collimator changes and custom plugging, fractionated treatment, all lesions, per session, second through fifth sessions, maximum 5 sessions per course of treatment

Stereotactic Radiosurgery

CPT/HCPCS

77295	.....	3-dimensional radiotherapy plan, including dose-volume histograms
77301	.....	Intensity modulated radiation therapy plan, including dose volume histogram for target and critical structure partial tolerance specifications (when specified as treatment planning for SRS or SBRT)
77338	.....	Multi-leaf collimator (MLC) device(s) for intensity modulated radiation therapy (IMRT), design and construction per IMRT plan (when specified as devices for SRS or SBRT)
77370	.....	Special medical radiation physics consultation
77371	.....	Radiation treatment delivery, stereotactic radiosurgery (SRS) complete course of treatment of cranial lesion(s) consisting of 1 session; multi-source Cobalt 60 based

- 77372 Radiation treatment delivery, stereotactic radiosurgery (SRS) complete course of treatment of cranial lesion(s) consisting of 1 session; linear accelerator based
- 77432 Stereotactic radiation treatment management of cranial lesion(s) (complete course of treatment consisting of 1 session)
- G0339 Image guided robotic linear accelerator-based stereotactic radiosurgery, complete course of therapy in one session or first session of fractionated treatment
- G0340 Image guided robotic linear accelerator-based stereotactic radiosurgery, delivery including collimator changes and custom plugging, fractionated treatment, all lesions, per session, second through fifth sessions, maximum 5 sessions per course of treatment

Stereotactic Body Radiation Therapy and Stereotactic Radiosurgery

ICD-10 Diagnoses

- C18.0 - C18.9 Malignant neoplasm of colon
- C19 - C20 Malignant neoplasm of rectum and rectosigmoid junction
- C34.90 - C34.92 ... Malignant neoplasm of unspecified part of bronchus or lung
- C40.0 - C40.92 Malignant neoplasm of bones of limb
- C43.0 - C43.9 Malignant melanoma
- C49.0 - C49.9 Malignant neoplasm of connective and soft tissue
- C50.011-C50.929 . Malignant neoplasm of breast
- C61..... Malignant neoplasm of prostate
- C64.1 - C64.9 Malignant neoplasm of kidney, except renal pelvis
- C68.8 - C68.9 Malignant neoplasm of urinary organ(s)
- C78.5..... Secondary malignant neoplasm of large intestine and rectum
- C79.81..... Secondary malignant neoplasm of breast
- C7A.022-C7A.029 Malignant carcinoid tumor of the colon
- C96.4..... Soft tissue sarcoma of dendritic cells (accessory cells)
- Z85.118 Personal history of other malignant neoplasm of bronchus and lung
- Z85.3..... Personal history of malignant neoplasm of breast
- Z85.528 Personal history of other malignant neoplasm of kidney
- Z85.820 Personal history of malignant melanoma of skin

References

- Alongi, F, Mazzola, R, Figlia, V, et al. Stereotactic body radiotherapy for lung oligometastases: literature review according to PICO criteria. *Tumori*. 2018;104(3):148-56.
- Bates, JE, De Leo, AN, Morris, CG, et al. Oligometastatic squamous cell carcinoma of the head and neck treated with stereotactic body ablative radiotherapy: single-institution outcomes. *Head Neck*. 2019;20:20.
- de Jong, MC, Pulitano, C, Ribero, D, et al. Rates and patterns of recurrence following curative intent surgery for colorectal liver metastasis: an international multi-institutional analysis of 1669 patients. *Ann Surg*. 2009;250(3):440-8.
- Gomez, DR, Tang, C, Zhang, J, et al. Local consolidative therapy vs. maintenance therapy or observation for patients with oligometastatic non-small-cell lung cancer: long-term results of a multi-institutional, phase II, randomized study. *J Clin Oncol*. 2019:[14 p.].
- House, MG, Ito, H, Gonen, M, et al. Survival after hepatic resection for metastatic colorectal cancer: trends in outcomes for 1,600 patients during two decades at a single institution. *J Am Coll Surg*. 2010;210(5):744-52, 52-5.
- Hoyer, M, Swaminath, A, Bydder, S, et al. Radiotherapy for liver metastases: a review of evidence. *Int J Radiat Oncol Biol Phys*. 2012;82(3):1047-57.
- Iyengar, P, Wardak, Z, Gerber, DE, et al. Consolidative radiotherapy for limited metastatic non-small-cell lung cancer: a phase 2 randomized clinical trial. *JAMA Oncol*. 2018;4(1):e173501.
- Jingu, K, Matsushita, H, Yamamoto, T, et al. Stereotactic radiotherapy for pulmonary oligometastases from colorectal cancer: a systematic review and meta-analysis. *Technol Cancer Res Treat*. 2018;17:[7 p.].
- Kobiela, J, Szychalski, P, Marvaso, G, et al. Ablative stereotactic radiotherapy for oligometastatic colorectal cancer: systematic review. *Crit Rev Oncol Hematol*. 2018;129:91-101.
- Nordlinger, B, Guiguet, M, Vaillant, JC, et al. Surgical resection of colorectal carcinoma metastases to the liver. A prognostic scoring system to improve case selection, based on 1568 patients. *Association Francaise de Chirurgie. Cancer*. 1996;77(7):1254-62.

11. Olson, R, Senan, S, Harrow, S, et al. Quality of life outcomes after stereotactic ablative radiation therapy (SABR) versus standard of care treatments in the oligometastatic setting: a secondary analysis of the SABR-COMET randomized trial. *Int J Radiat Oncol Biol Phys.* 2019;105(5):943-7.
12. Ost, P, Reynders, D, Decaestecker, K, et al. Surveillance or metastasis-directed therapy for oligometastatic prostate cancer recurrence: a prospective, randomized, multicenter phase II trial. *J Clin Oncol.* 2018;36(5):446-53.
13. Palma, DA, Olson, R, Harrow, S, et al. Stereotactic ablative radiotherapy versus standard of care palliative treatment in patients with oligometastatic cancers (SABR-COMET): a randomised, phase 2, open-label trial. *Lancet.* 2019;10:10.
14. Petrelli, F, Comito, T, Barni, S, et al. Stereotactic body radiotherapy for colorectal cancer liver metastases: a systematic review. *Radiother Oncol.* 2018;129(3):427-34.
15. Rees, M, Tekkis, PP, Welsh, FK, et al. Evaluation of long-term survival after hepatic resection for metastatic colorectal cancer: a multifactorial model of 929 patients. *Ann Surg.* 2008;247(1):125-35.
16. Ruers, T, Van Coevorden, F, Punt, CJ, et al. Local treatment of unresectable colorectal liver metastases: results of a randomized Phase II trial. *J Natl Cancer Inst.* 2017;109(9):[10 p.].
17. Suter, P, Clump, DA, Kalash, R, et al. Initial results of a multicenter phase 2 trial of stereotactic ablative radiation therapy for oligometastatic cancer. *Int J Radiat Oncol Biol Phys.* 2019;103(1):116-22.
18. Tsao, MN, Ven, LI, Cheung, P, et al. Stereotactic body radiation therapy for extracranial oligometastatic non-small-cell lung cancer: a systematic review. *Clin Lung Cancer.* 2020;21(2):95-105.e1.
19. Vilela, RA, Navarro, NF, Faria, ET, et al. Use of stereotactic body radiation therapy for oligometastatic recurrent prostate cancer: a systematic review. *J Med Imaging Radiat Oncol.* 2018;62(5):692-706.
20. Weichselbaum, RR, Hellman, S. Oligometastases revisited. *Nat Rev Clin Oncol.* 2011;8(6):378-82.

Other Tumor Types: Sarcoma, Thymoma and Thymic Carcinoma, Pediatric Tumors, and Other Malignancies

General Information

Commonly Used Modalities

Internal Radiation Therapy (Brachytherapy)

External Beam Radiation Therapy

- 2D or 3D conformal
- Intensity Modulated Radiation Therapy (IMRT)
- Stereotactic Body Radiation Therapy (SBRT)
- Stereotactic Radiosurgery (SRS)

Proton Beam: please see separate Proton Beam Therapy guideline

Radiation Oncology Considerations

Sarcomas

Soft tissue sarcomas are rare malignancies arising in connective tissue. Multimodality treatment with surgery, radiation and chemotherapy is common, especially in high-grade sarcomas. Multiple studies have shown that radiation improves local control. Soft tissue sarcomas are often treated with preoperative therapy to a dose of 50 Gy. Placement of clips at the time of surgery aids with boost planning if needed. Alternatively, postoperative radiation therapy can be given. External beam treatment typically consists of 50 Gy to a larger field encompassing the preoperative tumor volume plus a margin followed by a smaller boost field. Boost doses of 10-26 Gy are used, depending on the final surgical margins. Brachytherapy may also be used postoperatively, particularly in the setting of microscopic or gross residual disease after resection. Alternatively, intra-operative radiation may be considered as boost treatment at the time of surgery.

In terms of radiation planning, the use of MRI imaging and CT based planning are recommended. IMRT is sometimes utilized, but is particularly helpful in the setting of pelvic or retroperitoneal sarcoma, to minimize toxicity in this high-risk anatomic region. IMRT for sarcomas in other regions remains an area of active investigation. A recent RTOG study of image guidance suggested that toxicity is lower when field size is reduced in conjunction with daily IGRT. Many of these patients were treated with IMRT. Other retrospective comparisons of conventional radiation and IMRT have been published. A study by Folkert reported recurrence rates for 319 consecutive patients, about half of whom were treated with IMRT. There was an association between IMRT and improved local control. The authors note, however, that other confounding factors such as the use of MRI in treatment planning may explain the difference. The use of IMRT for soft tissue sarcomas is appropriate for pelvic, retroperitoneal and extremity soft tissue sarcoma.

Thymoma and Thymic Carcinoma

Thymomas are rare tumors arising in epithelial cells within the thymus. They can be benign or malignant. For lesions which are resectable, complete thymectomy and excision of tumor is recommended. Radiotherapy is added for stage III disease or in cases where the tumor is unresectable or incompletely resected. Doses of 45-50 Gy are used after resection with clear or close margins. A dose of 54 Gy is used for microscopically positive margins and doses of 60-70 Gy are given for gross disease. Chemotherapy is used in advanced or metastatic disease. CT-based treatment planning is recommended, as is respiratory motion management if available. Much like mediastinal Hodgkin lymphoma, IMRT is appropriate in order to spare heart and lung tissue.

Pediatric tumor types

IMRT is a method to spare normal tissue from radiation damage, and reduce the risk of toxicity, complications, and secondary malignancy in normal tissues that are still developing. IMRT has demonstrated excellent potential in sparing the organs at risk while achieving good local control. Therefore, IMRT is helpful in treating pediatric tumors that are sensitive to radiation therapy. Please see proton beam guidelines for further details regarding use of protons in pediatric tumors.

Other tumor types

Intensity modulated radiation therapy (IMRT) and stereotactic radiation techniques are used in the setting of overlapping with a previously irradiated field, due to the risk of toxicity or complications.

For review of metastatic sites, please refer to specific guidelines for the appropriate location (e.g., CNS Cancers for brain metastases and Lung Cancer for lung metastases).

Clinical Indications

2D or 3D conformal

2D or 3D conformal is appropriate **when ANY of the following conditions are met:**

- Primary malignancy diagnoses
- Metastatic lesions

Sarcoma

Intensity Modulated Radiation Therapy (IMRT) is appropriate for sarcoma **when ANY of the following conditions are met:**

- For initial treatment of a primary pelvic soft tissue sarcoma
- For initial treatment of a primary retroperitoneal sarcoma
- For treatment of an extremity sarcoma
- To treat a previously irradiated field

Stereotactic Radiosurgery (SRS) is appropriate for sarcoma when the following condition is met:

- Only to treat a previously irradiated field

Brachytherapy (LDR or HDR) is appropriate for sarcoma **when ANY of the following conditions are met:**

- When margins are involved
- When margins are closer than 5 mm

Thymoma and Thymic Carcinoma

Intensity Modulated Radiation Therapy (IMRT) is appropriate for treatment of thymoma and thymic carcinoma **when ANY of the following conditions are met:**

- For treatment of a mediastinal thymoma or thymic carcinoma **OR**
- To treat a previously irradiated field

Stereotactic Radiosurgery (SRS) is appropriate for thymoma and thymic carcinoma when the following condition is met:

- Only to treat a previously irradiated field

Pediatric individuals (age less than 21)

Intensity Modulated Radiation Therapy (IMRT) is appropriate for pediatric patients when the following condition is met:

- To treat pediatric individuals, age less than 21, with a radiosensitive tumor

Stereotactic Radiosurgery (SRS) or Stereotactic Body Radiation Therapy (SBRT) is appropriate for pediatric patients **when ANY of the following conditions are met:**

- To treat an intracranial malignancy (see CNS guidelines) **OR**
- To treat a previously irradiated field

Note: see Proton Beam Therapy Guidelines for proton beam indications.

Other Malignancies

Intensity Modulated Radiation Therapy (IMRT) is appropriate for other malignancies **when ANY of the following conditions is met:**

- Where risk of critical structure (heart, lung) exposure would be excessive with 3D conformal treatment **(both must be met):**
 - 3D planning has been done with appropriate techniques to limit toxicity, but organ at risk limits have been exceeded (based on QUANTEC limits*)
 - IMRT demonstrates improvement to tissue exposure to within safe ranges
- To treat a previously irradiated field

Stereotactic Body Radiation Therapy (SBRT) is appropriate for other malignancies when the following condition is met:

- Only to treat a previously irradiated field

Codes

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Specific CPT codes for services should be used when available. Nonspecific or not otherwise classified codes may be subject to additional documentation requirements and review.

3D Conformal

CPT/HCPCS

77295 3-dimensional radiotherapy plan, including dose-volume histograms

ICD-10 Diagnoses

Not specified

Intensity Modulated Radiation Therapy

CPT/HCPCS

77301 Intensity modulated radiotherapy plan, including dose-volume histograms for target and critical structure partial tolerance specifications

77338 Multi-leaf collimator (MLC) device(s) for intensity modulated radiation therapy (IMRT), design and construction per IMRT plan

77386 Intensity modulated radiation treatment delivery (IMRT), includes guidance and tracking, when performed; complex

G6015 Intensity modulated treatment delivery, single or multiple fields/arcs, via narrow spatially and temporally modulated beams, binary, dynamic MLC, per treatment session

G6016 Compensator-based beam modulation treatment delivery of inverse planned treatment using 3 or more high resolution (milled or cast) compensator, convergent beam modulated fields, per treatment session

ICD-10 Diagnoses

C37..... Malignant neoplasm of thymus
 C48..... Malignant neoplasm of retroperitoneum
 C49.10 - C49.12... Malignant neoplasm of connective and soft tissue of the upper limb
 C49.20 - C49.22... Malignant neoplasm of connective and soft tissue of the lower limb
 C49.4, C49.5 Malignant neoplasm of connective and other soft tissue of abdomen, pelvis
 D15.0..... Benign neoplasm of thymus

Stereotactic Body Radiation Therapy**CPT/HCPCS**

77295 3-dimensional radiotherapy plan, including dose-volume histograms
 77301 Intensity modulated radiation therapy plan, including dose volume histogram for target and critical structure partial tolerance specifications (when specified as treatment planning for SRS or SBRT)
 77338 Multi-leaf collimator (MLC) device(s) for intensity modulated radiation therapy (IMRT), design and construction per IMRT plan (when specified as devices for SRS or SBRT)
 77370 Special medical radiation physics consultation
 77373 Stereotactic body radiation therapy, treatment delivery, per fraction to 1 or more lesions, including image guidance, entire course not to exceed 5 fractions
 77435 Stereotactic body radiation therapy, treatment management, per treatment course, to 1 or more lesions, including image guidance, entire course not to exceed 5 fractions
 77470 Special treatment procedure
 G0339 Image guided robotic linear accelerator-based stereotactic radiosurgery, complete course of therapy in one session or first session of fractionated treatment
 G0340 Image guided robotic linear accelerator-based stereotactic radiosurgery, delivery including collimator changes and custom plugging, fractionated treatment, all lesions, per session, second through fifth sessions, maximum 5 sessions per course of treatment

ICD-10 Diagnoses

Z92.3..... Personal history of irradiation

Stereotactic Radiosurgery**CPT/HCPCS**

77295 3-dimensional radiotherapy plan, including dose-volume histograms
 77301 Intensity modulated radiation therapy plan, including dose volume histogram for target and critical structure partial tolerance specifications (when specified as treatment planning for SRS or SBRT)
 77338 Multi-leaf collimator (MLC) device(s) for intensity modulated radiation therapy (IMRT), design and construction per IMRT plan (when specified as devices for SRS or SBRT)
 77370 Special medical radiation physics consultation
 77371 Radiation treatment delivery, stereotactic radiosurgery (SRS) complete course of treatment of cranial lesion(s) consisting of 1 session; multi-source Cobalt 60 based
 77372 Radiation treatment delivery, stereotactic radiosurgery (SRS) complete course of treatment of cranial lesion(s) consisting of 1 session; linear accelerator based
 77432 Stereotactic radiation treatment management of cranial lesion(s) (complete course of treatment consisting of 1 session)
 G0339 Image guided robotic linear accelerator-based stereotactic radiosurgery, complete course of therapy in one session or first session of fractionated treatment
 G0340 Image guided robotic linear accelerator-based stereotactic radiosurgery, delivery including collimator changes and custom plugging, fractionated treatment, all lesions, per session, second through fifth sessions, maximum 5 sessions per course of treatment

ICD-10 Diagnoses

Z92.3..... Personal history of irradiation

Brachytherapy

CPT/HCPCS

20555	Placement of needles or catheters into muscle and/or soft tissue for subsequent interstitial radioelement application (at the time of or subsequent to the procedure)
77295	3-dimensional radiotherapy plan, including dose-volume histograms
77316	Brachytherapy isodose plan; simple (1-4 sources or 1 channel), includes basic dosimetry calculations (Do not bill 77300)
77317	Brachytherapy isodose plan; intermediate (5-10 sources or 2-12 channels), includes basic dosimetry calculation (Do not bill 77300)
77318	Brachytherapy isodose plan; complex (over 10 sources or over 12 channels), includes basic dosimetry calculations (Do not bill 77300)
77370	Special medical radiation physics consultation
77470	Special treatment procedure
77761	Intracavitary radiation source application; simple
77762	Intracavitary radiation source application; intermediate
77763	Intracavitary radiation source application; complex
77770	Remote afterloading high dose rate radionuclide interstitial or intracavitary brachytherapy, includes basic dosimetry, when performed; 1 channel
77771	Remote afterloading high dose rate radionuclide interstitial or intracavitary brachytherapy, includes basic dosimetry, when performed; 2-12 channels
77772	Remote afterloading high dose rate radionuclide interstitial or intracavitary brachytherapy, includes basic dosimetry, when performed; over 12 channels
77778	Interstitial radiation source application, complex, includes supervision, handling, loading of radiation source, when performed

ICD-10 Diagnoses

C49.0 - C49.9..... Malignant neoplasm of connective and other soft tissue

References

1. American Society for Radiation Oncology (ASTRO). ASTRO model policies: intensity modulated radiation therapy (IMRT). ([Updated 06-06-2019]) [18 p.]. Available from: <https://www.astro.org/Daily-Practice/Reimbursement/Model-Policies>.
2. Bhatnagar, A, Deutsch, M. The role for intensity modulated radiation therapy (IMRT) in pediatric population. *Technol Cancer Res Treat*. 2006;5(6):591-5.
3. Blumenfeld, P, Sen, N, Abrams, R, et al. Advances in radiation therapy for primary and metastatic adult soft tissue sarcomas. *Curr Oncol Rep*. 2016;18(6):36.
4. Girard, N, Mornex, F. The role of radiotherapy in the management of thymic tumors. *Thorac Surg Clin*. 2011;21(1):99-105, vii.
5. Gomez, D, Komaki, R. Technical advances of radiation therapy for thymic malignancies. *J Thorac Oncol*. 2010;5(10 Suppl 4):S336-43.
6. Hoefkens, F, Dehandschutter, C, Somville, J, et al. Soft tissue sarcoma of the extremities: pending questions on surgery and radiotherapy. *Radiat Oncol*. 2016;11(1):136.
7. Holloway, CL, Delaney, TF, Alektiar, KM, et al. American Brachytherapy Society (ABS) consensus statement for sarcoma brachytherapy. *Brachytherapy*. 2013;12(3):179-90.
8. Huang, E, Teh, BS, Strother, DR, et al. Intensity-modulated radiation therapy for pediatric medulloblastoma: early report on the reduction of ototoxicity. *Int J Radiat Oncol Biol Phys*. 2002;52(3):599-605.
9. Jackson, MW, Palma, DA, Camidge, DR, et al. The Impact of Postoperative Radiotherapy for Thymoma and Thymic Carcinoma. *J Thorac Oncol*. 2017;12(4):734-44.
10. Kim, B, Chen, YL, Kirsch, DG, et al. An effective preoperative three-dimensional radiotherapy target volume for extremity soft tissue sarcoma and the effect of margin width on local control. *Int J Radiat Oncol Biol Phys*. 2010;77(3):843-50.
11. Leachman, BK, Galloway, TJ. The role for radiation therapy in the management of sarcoma. *Surg Clin North Am*. 2016;96(5):1127-39.
12. Naghavi, AO, Fernandez, DC, Mesko, N, et al. American Brachytherapy Society consensus statement for soft tissue sarcoma brachytherapy. *Brachytherapy*. 2017;16(3):466-89.
13. Richard, P, Phillips, M, Smith, W, et al. Cost-effectiveness analysis of intensity modulated radiation therapy versus 3-dimensional conformal radiation therapy for preoperative treatment of extremity soft tissue sarcomas. *Int J Radiat Oncol Biol Phys*. 2016;95(3):999-1008.

14. Sterzing, F, Stoiber, EM, Nill, S, et al. Intensity modulated radiotherapy (IMRT) in the treatment of children and adolescents--a single institution's experience and a review of the literature. *Radiat Oncol.* 2009;4(37):[10 p.].
15. Tiong, SS, Dickie, C, Haas, RL, et al. The role of radiotherapy in the management of localized soft tissue sarcomas. *Cancer Biol.* 2016;13(3):373-83.
16. Wang, D, Zhang, Q, Eisenberg, BL, et al. Significant Reduction of Late Toxicities in Patients With Extremity Sarcoma Treated With Image-Guided Radiation Therapy to a Reduced Target Volume: Results of Radiation Therapy Oncology Group RTOG-0630 Trial. *J Clin Oncol.* 2015;33(20):2231-8.

ARCHIVED

Prostate Cancer

General Information

Commonly Used Modalities

Internal Radiation Therapy (Brachytherapy)

External Beam Radiation Therapy

- 2D and 3D conformal
- Intensity Modulated Radiation Therapy (IMRT)
- Stereotactic Body Radiation Therapy (SBRT)

Radiation Oncology Considerations

Prostate cancer is the most common cancer seen in men. Early detection has resulted in a decrease in prostate cancer mortality over the past two decades.

Active surveillance options should be discussed with individuals with low-risk prostate cancers. Furthermore, individuals with low- or intermediate-risk prostate cancer and an anticipated survival of less than 10 years based on comorbidity are recommended to be followed with observation, as the risk of over-treatment may outweigh the clinical benefit.

External beam radiotherapy and surgery are the primary treatment modalities in patients who do not opt for surveillance. Improvement in radiation therapy delivery, including 3D-conformal radiation and IMRT, have allowed for the safe dose escalation which has improved cure rates in patients with localized disease. Pelvic nodal irradiation should be limited to individuals with intermediate-risk or high-risk disease.

There is a trend toward hypofractionation (fewer treatments to deliver the same biologic dose) which allows patients to be treated with less disruption of their daily lives. There have been several randomized clinical trials comparing conventionally fractionated external radiotherapy with hypofractionated regimens. RTOG 0415 was designed to evaluate the non-inferiority of hypofractionated treatment (70.8 Gy in 28 fractions) compared to conventional fractionation (73.8 Gy in 42 fractions). There were 1092 participants. At a median follow-up of 5.9 years, the estimated 5-year disease-free survival rate was 85.3% in the conventional radiotherapy arm and 86.3% in the hypofractionated radiotherapy arm. The hypofractionated arm was associated with a significant increase in late grade 2 and 3 gastrointestinal and genitourinary adverse events. Based on the DFS rates, hypofractionated radiotherapy was found to be non-inferior. In the HYPRO trial, patients with intermediate to high-risk prostate cancer were randomized to receive 78 Gy in 38 fractions or 64.6 Gy in 19 fractions. At 5 years, the relapse-free survival rates for conventional fractionation vs hypofractionation were 77.1% and 80.5%, respectively. Since the goal of the trial was to prove superiority of hypofractionation, the authors concluded that hypofractionation had not been proven superior to standard fractionation. Hypofractionation does appear non-inferior in this study. In the PROFIT trial, investigators randomly assigned patients with intermediate-risk prostate cancer to receive 78 Gy in 39 fractions or 60 Gy in 20 fractions. With 6 years of follow-up, biochemical disease-free survival was the same in both groups. There were no differences in \geq grade 3 late GI or GU toxicities reported. Five-year results of the CHHip trial were recently published. This was an open-label, randomized study looking at both effectiveness and toxicities. A total of 3216 men were included. They compared 74 Gy in 37 fractions over a period of 7.4 weeks with hypofractionated radiotherapy at 60 Gy in 20 fractions over a period of 4 weeks or 57 Gy in 19 fractions over a period of 3.8 weeks. At the 5-year follow-up, biochemical or clinical failure-free rates were 88.3% in the conventional 74-Gy group, 90.6% in the hypofractionated 60-Gy group, and 85.9% in the hypofractionated 57-Gy group. While bladder and bowel symptoms peaked sooner in the hypofractionated groups (4-5 vs 7-8 weeks), at 18 weeks, rates were similar for all groups. Long-term adverse effects were similar among the treatment groups. The authors concluded that the hypofractionated approach using 60 Gy in 20 fractions was non-inferior to standard fractionation using 74 Gy in 37 fractions.

In 2018, ASTRO, ASCO, and AUA published an evidence-based guideline on hypofractionated radiation therapy for localized prostate cancer. They defined moderate hypofractionation as daily fractions ranging from 240 cGy to 340 cGy and ultrahypofractionation as daily fractions > 500 cGy. The latter is given in up to 5 fractions of SBRT. In comparing moderately fractionated IMRT with conventionally fractionated treatment, the panel has recommended that hypofractionated therapy should be offered to men with low- or intermediate-risk prostate cancer who opt for active treatment. These recommendations were both considered strong, were based on high-quality evidence, and had 100% consensus. Moderate hypofractionation should also be offered for high-risk prostate cancer where pelvic nodes will not be treated based on 94% consensus. They recommended that men be counselled of a small increased risk of temporary GI toxicity with hypofractionated regimens but noted that late GI and GU toxicities were similar in hypofractionated and conventional treatments. General and prostate specific quality of life (QOL) and patient reported outcome studies have shown good tolerance of the hypofractionated regimens. The suggested fractionation patterns are either 6,000 cGy in 20 fractions or 7,000 cGy in 28 fractions.

Postoperative radiotherapy (EBRT/IMRT) can be delivered in either the adjuvant or salvage setting. Indications for adjuvant prostate bed radiotherapy include T3 primary, extracapsular disease, seminal vesicle involvement, Gleason 8 or 9 disease and positive margins. Salvage radiotherapy is indicated in patients at risk for local failure who have a rising prostate specific antigen (PSA) level. When adjuvant radiation therapy is indicated, it should be given within 1 year of radical prostatectomy, but after any post-operative issues have stabilized. ASTRO and AUA published an updated clinical practice guideline on the use of adjuvant and salvage radiotherapy after prostatectomy in 2019 to reflect new level 1 evidence demonstrating the addition of hormonal ablation to salvage treatment.

SBRT for prostate cancer is an emerging modality. This technology delivers a high biologic dose of radiation over a short period of time. The hypofraction associated with SBRT shortens the treatment time to five visits, compared to the 7 to 9 weeks typically required for IMRT. This shortened treatment time is (one week vs 8 to 9 weeks) is appreciated by individuals. The key outcomes include both tumor control and toxicity, primarily focusing on acute and chronic rectal and genitourinary complications. While there have been no controlled studies directly comparing SBRT and alternative techniques of conformal therapy (for example, IMRT) many prospective case series and retrospective cohort studies of subjects with localized low-risk and intermediate-risk prostate cancer and prolonged life expectancies have consistently reported that SBRT is associated with an acceptable toxicity profile and tumor control that is comparable to other radiation techniques. As with other treatments for prostate cancer, it is unlikely that randomized comparisons will be performed. Published studies to date include single institution reports, multi-institutional phase I/II studies looking at dose and systematic reviews. Hannan has recently published 5-year results of a prospective phase I/II trial of SBRT in 91 low-risk to intermediate-risk patients. About two-thirds of the patients had intermediate-risk disease. Doses of 45-50 Gy in five fractions were given. The 5-year freedom from biochemical failure was 98.6%. Grade 3 or greater late urinary and gastrointestinal toxicities were 5.5% and 7%, respectively. The highest rates of toxicity were seen in the 50 Gy cohort and the authors recommend against this dose. At the lower doses, toxicities are similar to that seen in dose-escalated IMRT. The most recent systematic review of SBRT for prostate cancer looked at 1,472 patients in 14 studies. The most common fractionation ranged from 35-36.25 Gy in five fractions. Most of these reports were for patients treated with Cyberknife. Biochemical progression-free survival ranged from 81%-100%. Acute and late grade 3 urinary and gastrointestinal toxicities ranged from 0-0.5% (acute) to 0.5%-1.3% (late). In May 2013, ASTRO updated its Model Policy for SBRT and states "It is ASTRO's opinion that data supporting the use of SBRT for prostate cancer have matured to a point where SBRT could be considered an appropriate alternative for select patients with low to intermediate risk disease."

The 2018 ASTRO, ASCO, and AUA guideline on ultrahypofractionated radiotherapy for prostate cancer recommends offering SBRT to men with low-risk disease, considers SBRT an option in intermediate-risk disease, and does not recommend SBRT for high-risk disease outside of a clinical trial or registry.

Brachytherapy or prostate implant is another option to deliver highly conformal doses to the prostate. For a low dose rate (LDR) implant, permanent radioactive seeds are implanted evenly throughout the gland under ultrasound guidance. For a high dose rate (HDR) implant, catheters are placed into the gland which is later irradiated as the high activity seed stops in fixed dwell positions throughout the volume. Recently, the ASCO/Ontario Guideline on brachytherapy for prostate cancer was updated. For low-risk patients, LDR brachytherapy is a proven option to surgery or external beam radiotherapy. For intermediate and high-risk patients, either LDR or HDR brachytherapy should be considered as boost options in appropriate patients. Studies have shown improved survival when brachytherapy is used in this setting compared to external

treatment alone. Both I-125 and palladium-103 are reasonable isotopes for LDR brachytherapy. No recommendation could be made for or against the use of Cs-131. The panel could not make a recommendation regarding HDR monotherapy.

The use of an implanted hydrogel spacer between the prostate and rectum has been studied as a way to minimize rectal symptoms during and after definitive radiotherapy for adenocarcinoma of the prostate. The study's statistical methodology and conclusions have been criticized, concluding that clinical benefit, if any, is minimal. A recent Cochrane review of interventions to reduce acute and late adverse GI effects of pelvic radiotherapy concluded that "low-certainty evidence on balloon and hydrogel spacers suggests that these interventions for prostate cancer RT may make little or no difference to GI outcomes." The use of an implanted hydrogel spacer is not medically necessary.

For a discussion of proton therapy, please refer to the separate Proton Beam Therapy Guidelines.

Disease Definitions

Low-risk of recurrence (ALL must be present to qualify as low risk)

- Stage T1-T2a
- Gleason score of 6
- Prostate-specific antigen (PSA) below 10 ng/mL

Intermediate-risk of recurrence (ANY one characteristic)

- Stage T2b to T2c
- Gleason score of 7
- PSA 10-20 ng/mL

High-risk of recurrence (ANY one characteristic)

- Stage T3a
- Gleason score 8-10
- PSA greater than 20 ng/mL

Localized disease (BOTH must apply)

- T stage of T1-3a (tumor has spread through the capsule on one or both sides but has not invaded the seminal vesicles or other structures)
- N0 (no lymph node involvement)

Locally advanced disease (EITHER must apply)

- Any T status with N1 disease (either no spread to lymph nodes or there has been spread to the regional lymph nodes)
- T3b and above, no distant metastatic disease beyond local lymph nodes

Distant metastatic disease

- Beyond the local lymph nodes

Clinical Indications

2D or 3D conformal is appropriate for prostate cancer when ANY of the following conditions are met:

- Primary treatment of prostate cancer
- Palliative treatment of advanced disease

Low risk of recurrence

Intensity Modulated Radiation Therapy (IMRT) is appropriate for prostate cancer **when ANY of the following conditions are met:**

- When anticipated survival is greater than 10 years
- To treat a previously irradiated field

Stereotactic Body Radiation Therapy (SBRT) is appropriate for prostate cancer **when ANY of the following conditions are met:**

- When anticipated survival is greater than 10 years
- To treat a previously irradiated field

Brachytherapy is appropriate for prostate cancer when the following condition is met:

- Permanent low dose rate brachytherapy is used as monotherapy

Note: Active surveillance is a reasonable alternative to radiation treatment in individuals with low risk prostate cancer.

Intermediate risk of recurrence

Intensity Modulated Radiation Therapy (IMRT) is appropriate for prostate cancer **when ANY of the following conditions are met:**

- When anticipated survival is greater than 10 years
- To treat a previously irradiated field

Stereotactic Body Radiation Therapy (SBRT) is appropriate for prostate cancer **when ANY of the following conditions are met:**

- When anticipated survival is greater than 10 years
- To treat a previously irradiated field

Brachytherapy, consider as a boost in combination with external beam radiotherapy. **EITHER of the following is appropriate:**

- Low dose rate (LDR) brachytherapy
 - High dose rate (HDR) brachytherapy
-

High risk of recurrence

Intensity Modulated Radiation Therapy (IMRT) is appropriate for prostate cancer **when ANY of the following conditions are met:**

- Localized disease and locally advanced disease
 - With or without brachytherapy
- To treat a previously irradiated field

Stereotactic Body Radiation Therapy (SBRT) is appropriate for prostate cancer when the following condition is met

- Only to treat a previously irradiated field

Brachytherapy is appropriate for prostate cancer when the following condition is met

- Used in combination with external beam radiation
-

Post-prostatectomy

Intensity Modulated Radiation Therapy (IMRT) is appropriate for prostate cancer **when ANY of the following conditions are met:**

- Adjuvant therapy, with no evidence of metastatic disease (**when either is present**)
 - Detectable PSA
 - Any adverse pathologic feature
 - pT3 disease
 - Pathology demonstrates positive margin(s)
 - Gleason score 8-10
 - Seminal vesicle involvement or invasion
 - Extracapsular extension
- Salvage therapy
 - Undetectable PSA becomes detectable and increases on 2 or more lab measurements
- To treat a previously irradiated field

Stereotactic Body Radiation Therapy (SBRT) is appropriate for prostate cancer when the following condition is met:

- Only to treat a previously irradiated field

Local recurrence after radiotherapy

Intensity Modulated Radiation Therapy (IMRT) is appropriate for prostate cancer when the following condition is met:

- To treat locally recurrent disease with no evidence of distant metastasis

Stereotactic Body Radiation Therapy (SBRT) is appropriate for prostate cancer when the following condition is met:

- To treat locally recurrent disease with no evidence of distant metastasis

Brachytherapy is appropriate for prostate cancer when the following condition is met:

- Low dose rate (LDR) or High dose rate (HDR) brachytherapy
 - To treat locally recurrent disease with no evidence of distant metastasis

Fractionation

When the above criteria are met, the following fractionation applies:

The recommended EBRT/IMRT fractionation to treat localized prostate cancer when the pelvic lymph nodes will not be treated is either 60 Gy in 20 fractions or 70 Gy in 28 fractions. In men with significant baseline obstructive urinary symptoms, conventional fractionation of up to 45 fractions is considered medically necessary.

Up to 45 fractions of EBRT/IMRT are medically necessary for localized or locally recurrent prostate cancer when the pelvic lymph nodes will be treated.

Up to 40 fractions of EBRT/IMRT are medically necessary as adjuvant treatment to the prostate bed after prostatectomy.

Exclusions

Hydrogel spacer

The use of an implanted hydrogel spacer between the prostate and rectum is **not medically necessary**.

Codes

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The following code list is not meant to be all-inclusive. Authorization requirements will vary by health plan. Please consult the applicable health plan for guidance on specific procedure codes.

Specific CPT codes for services should be used when available. Nonspecific or not otherwise classified codes may be subject to additional documentation requirements and review.

3D Conformal

CPT/HCPCS

77295 3-dimensional radiotherapy plan, including dose-volume histograms

ICD-10 Diagnoses

C61..... Malignant neoplasm Prostate

Intensity Modulated Radiation Therapy

CPT/HCPCS

77301 Intensity modulated radiotherapy plan, including dose-volume histograms for target and critical structure partial tolerance specifications (IMRT treatment plan)

77338 Multi-leaf collimator (MLC) device(s) for intensity modulated radiation therapy (IMRT), design and construction per IMRT plan

77385 Intensity modulated radiation treatment delivery (IMRT), includes guidance and tracking when performed; Simple (includes breast cancer, prostate cancer and compensator-based IMRT)

G6015 Intensity modulated treatment delivery, single or multiple fields/arcs, via narrow spatially and temporally modulated beams, binary, dynamic MLC, per treatment session

G6016 Compensator-based beam modulation treatment delivery of inverse planned treatment using 3 or more high resolution (milled or cast) compensator, convergent beam modulated fields, per treatment session

ICD-10 Diagnoses

C61..... Malignant neoplasm Prostate

Stereotactic Body Radiation Therapy

CPT/HCPCS

77295 3-dimensional radiotherapy plan, including dose-volume histograms

77301 Intensity modulated radiation therapy plan, including dose volume histogram for target and critical structure partial tolerance specifications (IMRT treatment plan)

77338 Multi-leaf collimator (MLC) device(s) for intensity modulated radiation therapy (IMRT), design and construction per IMRT plan

77370 Special medical radiation physics consultation

77373 Stereotactic body radiation therapy, treatment delivery, per fraction to 1 or more lesions, including image guidance, entire course not to exceed 5 fractions

77435 Stereotactic body radiation therapy, treatment management, per treatment course, to 1 or more lesions, including image guidance, entire course not to exceed 5 fractions

77470 Special treatment procedure

G0339 Image guided robotic linear accelerator-based stereotactic radiosurgery, complete course of therapy in one session or first session of fractionated treatment

G0340 Image guided robotic linear accelerator-based stereotactic radiosurgery, delivery including collimator changes and custom plugging, fractionated treatment, all lesions, per session, second through fifth sessions, maximum 5 sessions per course of treatment

ICD-10 Diagnoses

C61..... Malignant neoplasm Prostate

Z92.3..... Personal history of irradiation

Brachytherapy

CPT/HCPCS

55875	Transperineal placement of needles or catheters into prostate for interstitial radioelement application, with or without cystoscopy
77295	3-dimensional radiotherapy plan, including dose-volume histograms
77316	Brachytherapy isodose plan; simple (1-4 sources or 1 channel), includes basic dosimetry calculations (Do not bill 77300)
77317	Brachytherapy isodose plan; intermediate (5-10 sources or 2-12 channels), includes basic dosimetry calculation (Do not bill 77300)
77318	Brachytherapy isodose plan; complex (over 10 sources or over 12 channels), includes basic dosimetry calculations (Do not bill 77300)
77370	Special medical radiation physics consultation
77470	Special treatment procedure
77771	Remote afterloading high dose rate radionuclide interstitial or intracavitary brachytherapy, includes basic dosimetry, when performed; 2-12 channels
77772	Remote afterloading high dose rate radionuclide interstitial or intracavitary brachytherapy, includes basic dosimetry, when performed; over 12 channels
77778	Interstitial radiation source application, complex, includes supervision, handling, loading of radiation source, when performed

Rectal Spacer

CPT/HCPCS

55874	Transperineal placement of biodegradable material, peri-prostatic, single or multiple injection(s), including image guidance, when performed
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ICD-10 Diagnoses

C61.....	Malignant neoplasm Prostate
Z92.3.....	Personal history of irradiation

References

1. American Society for Radiation Oncology (ASTRO). ASTRO model policies: intensity modulated radiation therapy (IMRT). ([Updated 06-06-2019]) [18 p.]. Available from: <https://www.astro.org/Daily-Practice/Reimbursement/Model-Policies>.
2. Amin, MB, Edge, SB, editors. AJCC cancer staging manual. 8th ed. Switzerland: Springer; 2017. 1024 p.
3. Bittner, NH, Orio, PF, 3rd, Merrick, GS, et al. The American College of Radiology and the American Brachytherapy Society practice parameter for transperineal permanent brachytherapy of prostate cancer. *Brachytherapy*. 2017;16(1):59-67.
4. Bruner, DW, Pugh, SL, Lee, WR, et al. Quality of life in patients with low-risk prostate cancer treated with hypofractionated vs conventional radiotherapy: a phase 3 randomized clinical trial. *JAMA Oncol*. 2019;5(5):664-70.
5. Carvalho, IT, Baccaglini, W, Claros, OR, et al. Genitourinary and gastrointestinal toxicity among patients with localized prostate cancer treated with conventional versus moderately hypofractionated radiation therapy: systematic review and meta-analysis. *Acta Oncol*. 2018;57(8):1003-10.
6. Chang, AJ, McBride, S, Keyes, M, et al. The American Brachytherapy Society and the American Radium Society Appropriate Use Criteria Genitourinary Committee endorse the American Society of Clinical Oncology/Cancer Care Ontario guidelines. *J Clin Oncol*. 2018;36(33):3342-4.
7. Chen, RC, Basak, R, Meyer, AM, et al. Association between choice of radical prostatectomy, external beam radiotherapy, brachytherapy, or active surveillance and patient-reported quality of life among men with localized prostate cancer. *JAMA*. 2017;317(11):1141-50.
8. Chin, J, Rumble, RB, Kollmeier, M, et al. Brachytherapy for patients with prostate cancer: American Society of Clinical Oncology/Cancer Care Ontario joint guideline update. *J Clin Oncol*. 2017;35(15):1737-43.
9. Cornford, P, Bellmunt, J, Bolla, M, et al. EAU-ESTRO-SIOG guidelines on prostate cancer. part II: treatment of relapsing, metastatic, and castration-resistant prostate cancer. *Eur Urol*. 2017;71(4):630-42.
10. Dearnaley, D, Syndikus, I, Mossop, H, et al. Conventional versus hypofractionated high-dose intensity-modulated radiotherapy for prostate cancer: 5-year outcomes of the randomised, non-inferiority, phase 3 CHHiP trial. *Lancet Oncol*. 2016;17(8):1047-60.
11. Gonzalez-Motta, A, Roach, M, 3rd. Stereotactic body radiation therapy (SBRT) for high-risk prostate cancer: where are we now? *Pract Radiat Oncol*. 2018;8(3):185-202.

12. Hannan, R, Tumati, V, Xie, XJ, et al. Stereotactic body radiation therapy for low and intermediate risk prostate cancer-results from a multi-institutional clinical trial. *Eur J Cancer*. 2016;59:142-51.
13. Hegde, JV, Collins, SP, Fuller, DB, et al. A pooled analysis of biochemical failure in intermediate-risk prostate cancer following definitive stereotactic body radiotherapy (SBRT) or high-dose-rate brachytherapy (HDR-B) monotherapy. *Am J Clin Oncol*. 2016;41(5):502-7.
14. Hickey, BE, James, ML, Daly, T, et al. Hypofractionation for clinically localized prostate cancer (review). *Cochrane Database Syst Rev*. 2019(9):article number CD011462.
15. Hoffman, KE, Voong, KR, Levy, LB, et al. Randomized trial of hypofractionated, dose-escalated, intensity-modulated radiation therapy (IMRT) versus conventionally fractionated IMRT for localized prostate cancer. *J Clin Oncol*. 2018;36(29):2943-9.
16. Hsu, IC, Yamada, Y, Assimos, DG, et al. ACR Appropriateness Criteria high-dose-rate brachytherapy for prostate cancer. *Brachytherapy*. 2014;13(1):27-31.
17. Incrocci, L, Wortel, RC, Alemayehu, WG, et al. Hypofractionated versus conventionally fractionated radiotherapy for patients with localised prostate cancer (HYPRO): final efficacy results from a randomised, multicentre, open-label, phase 3 trial. *Lancet Oncol*. 2016;17(8):1061-9.
18. Kee, DLC, Gal, J, Falk, AT, et al. Brachytherapy versus external beam radiotherapy boost for prostate cancer: systematic review with meta-analysis of randomized trials. *Cancer Treat Rev*. 2018;70:265-71.
19. King, CR, Freeman, D, Kaplan, I, et al. Stereotactic body radiotherapy for localized prostate cancer: pooled analysis from a multi-institutional consortium of prospective phase II trials. *Radiother Oncol*. 2013;109(2):217-21.
20. King, CR, Kamrava, M, Wang, PC, et al. In regard to Mariados et al. *Int J Radiat Oncol Biol Phys*. 2015;1(4):936-7.
21. Langrand-Escure, J, de Crevoisier, R, Llagostera, C, et al. Dose constraints for moderate hypofractionated radiotherapy for prostate cancer: the French Genito-Urinary Group (GETUG) recommendations. *Cancer Radiother*. 2018;22(2):193-8.
22. Lawrie, TA, Green, JT, Beresford, M, et al. Interventions to reduce acute and late adverse gastrointestinal effects of pelvic radiotherapy for primary pelvic cancers. *Cochrane Database Syst Rev*. 2018;Issue 1(Art. No. CD012529):1-391.
23. Mariados, N, Hamstra, DA. In reply to King et al. *Int J Radiat Oncol Biol Phys*. 2015;1(4):937-9.
24. Mariados, N, Sylvester, J, Shah, D, et al. Hydrogel spacer prospective multicenter randomized controlled pivotal trial: dosimetric and clinical effects of perirectal spacer application in men undergoing prostate image guided intensity modulated radiation therapy. *Int J Radiat Oncol Biol Phys*. 2015;92(5):971-7.
25. Morgan, SC, Hoffman, K, Loblaw, DA, et al. Hypofractionated radiation therapy for localized prostate cancer: executive summary of an ASTRO, ASCO and AUA evidence-based guideline. *J Urol*. 2019;201(3):528-34.
26. Mottet, N, Bellmunt, J, Briers, E, et al. EAU-ESTRO-ESUR-SIOG guidelines on prostate cancer [Internet] 2019 [cited 2020 Feb 24]. Available from: <https://uroweb.org/guideline/prostate-cancer/>.
27. Nagore, G, Lopez Guerra, JL, Krumina, E, et al. High dose rate brachytherapy for prostate cancer: a prospective toxicity evaluation of a one day schedule including two 13.5Gy fractions. *Radiother Oncol*. 2018;127(2):219-24.
28. NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines®) for Prostate Cancer (Version 1.2020). Available at <http://www.nccn.org>. ©National Comprehensive Cancer Network, 2020.
29. Nossiter, J, Sujenthiran, A, Cowling, TE, et al. Patient-reported functional outcomes after hypofractionated or conventionally fractionated radiation for prostate cancer: a national cohort study in England. *J Clin Oncol*. 2020;38(7):744-52.
30. Press, RHM, T. M.Cutrell, P. K.Zhang, C.Chen, Z.Rahnema, S.Sanda, M.Pattaras, J.Patel, P.Jani, A. B.Rossi, P. J. Patient-reported health-related quality of life outcomes after HDR brachytherapy between small (<60 cc) and large (>=60 cc) prostate glands. *Brachytherapy*. 2019;18(1):13-21.
31. Sanda, MG, Chen, RC, Crispino, T, et al. Clinically localized prostate cancer: AUA/ASTRO/SUO guideline [Internet]: American Urological Association; 2017 [cited 2020 Feb 24]. Available from: <https://www.auanet.org/guidelines/prostate-cancer-clinically-localized-guideline>.
32. Sheets, NC, Goldin, GH, Meyer, AM, et al. Intensity-modulated radiation therapy, proton therapy, or conformal radiation therapy and morbidity and disease control in localized prostate cancer. *JAMA*. 2012;307(15):1611-20.
33. Siddiqui, ZA, Gustafson, GS, Ye, H, et al. Five-year outcomes of a single-institution prospective trial of 19-Gy single-fraction high-dose-rate brachytherapy for low- and intermediate-risk prostate cancer. *Int J Radiat Oncol Biol Phys*. 2019;13:13.
34. Strouthos, I, Tselis, N, Chatzikonstantinou, G, et al. High dose rate brachytherapy as monotherapy for localised prostate cancer. *Radiother Oncol*. 2018;126(2):270-7.
35. Taira, AV, Merrick, GS, Butler, WM, et al. Long-term outcome for clinically localized prostate cancer treated with permanent interstitial brachytherapy. *Int J Radiat Oncol Biol Phys*. 2011;79(5):1336-42.
36. Tan, TJ, Siva, S, Foroudi, F, et al. Stereotactic body radiotherapy for primary prostate cancer: a systematic review. *J Med Imaging Radiat Oncol*. 2014;58(5):601-11.
37. Thompson, IM, Valicenti, R, Albertsen, PC, et al. Adjuvant and salvage radiotherapy after prostatectomy: ASTRO/AUA guideline [Internet] 2013, amended 2018 & 2019 [cited 2020 Feb 24]. Available from: <https://www.auanet.org/guidelines/prostate-cancer-adjuvant-and-salvage-radiotherapy-guideline>.

38. Widmark, A, Gunnlaugsson, A, Beckman, L, et al. Ultra-hypofractionated versus conventionally fractionated radiotherapy for prostate cancer: 5-year outcomes of the HYPO-RT-PC randomised, non-inferiority, phase 3 trial. *Lancet*. 2019;394(10196):385-95.
39. Yamazaki, H, Masui, K, Suzuki, G, et al. High-dose-rate brachytherapy monotherapy versus image-guided intensity-modulated radiotherapy with helical tomotherapy for patients with localized prostate cancer. *Cancers (Basel)*. 2018;10(9):[12 p.].
40. Yamazaki, H, Masui, K, Suzuki, G, et al. Comparison of three moderate fractionated schedules employed in high-dose-rate brachytherapy monotherapy for clinically localized prostate cancer. *Radiother Oncol*. 2018;129(2):370-6.
41. Yin, Z, You, J, Wang, Y, et al. Moderate hypofractionated radiotherapy vs conventional fractionated radiotherapy in localized prostate cancer: a systemic review and meta-analysis from Phase III randomized trials. *Onco Targets Ther*. 2019;12:1259-68.

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These Guidelines are a work in progress that may be refined as often as new significant data becomes available.

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Skin Cancer

General Information

Radiation Oncology Considerations

Skin cancer is the most common malignancy in the United States with more than 5 million cases diagnosed annually. Ninety five percent of these are basal cell carcinomas or cutaneous squamous cell carcinomas. Basal cell carcinoma is the most common form of skin cancer. These are less likely to spread to regional lymphatics than squamous cell carcinomas. Cutaneous melanomas are much more likely to have lymph node involvement than non-melanoma skin cancers and also have a significant risk of distant metastasis unless detected early.

The main risk factor for all skin cancers is UV exposure from the sun or other sources. Immunosuppressed patients, like those who have had an organ transplant, are much more commonly affected by skin cancer.

The primary treatment options are surgical excision or definitive radiation therapy. A detailed review of surgical options is beyond the scope of this guideline. Radiation options include superficial and orthovoltage x-rays, electrons, or high energy photons delivered with either 3D conformal or intensity modulated radiation therapy (IMRT). The vast majority of non-melanoma skin cancer lesions which are not approached surgically are treated with low energy x-rays or electrons where the cure rate approaches 95%. Melanomas or other skin cancers with risk of lymphatic involvement are best treated with 3D conformal and occasionally IMRT techniques.

In 2019, ASTRO published a Clinical Practice Guideline for definitive and postoperative treatment of basal and squamous cell cancers of the skin. The reviewed the commonly used radiation modalities used to treat skin cancer including electrons, low energy x-rays, megavoltage x-rays and brachytherapy. Regarding brachytherapy, they note that this technique may be preferentially used to for specific anatomic locations with complicated topology. Due to limited follow up information, they stress caution against extrapolating local control and toxicity data for electronic brachytherapy as compared to other radiation modalities.

NCCN has published guidelines for the treatment of basal cell, squamous cell and melanoma skin cancers. For all three guidelines, they note that there are “insufficient long-term efficacy and safety data to support the routine use of electronic surface brachytherapy.” The American Brachytherapy Society concludes that “it is not recommended that electronic brachytherapy be utilized for accelerated partial breast irradiation, non-melanomatous skin cancers, or vaginal cuff brachytherapy outside prospective clinical trials at this time.”

Clinical Indications

Superficial, Orthovoltage and 2D or 3D Conformal Radiotherapy is appropriate for skin cancer when ANY of the following conditions are met:

- As an alternative to surgery
- As postoperative treatment after surgery when there are positive margins or other high risk features

Intensity Modulated Radiation Therapy (IMRT) is appropriate for skin cancer when ANY of the following conditions are met:

- To treat a skin cancer of the head and neck region when the regional lymphatics will be treated
- To treat cutaneous melanoma
- To treat a previously irradiated field

Brachytherapy is appropriate for skin cancer when ANY of the following conditions are met:

- To treat a skin cancer which is not amenable to surgery or external beam radiation
- To treat a previously irradiation field

Electronic Brachytherapy is considered not medically necessary

Codes

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The following code list is not meant to be all-inclusive. Authorization requirements will vary by health plan. Please consult the applicable health plan for guidance on specific procedure codes.

Specific CPT codes for services should be used when available. Nonspecific or not otherwise classified codes may be subject to additional documentation requirements and review.

3D Conformal

CPT/HCPCS

77295	3-dimensional radiotherapy plan, including dose-volume histograms (3D Conformal treatment plan)
77401	Radiation treatment delivery, superficial and/or orthovoltage, per day
77402	Radiation treatment delivery, >1 MeV; simple
77407	Radiation treatment delivery, > 1 MeV; intermediate
77412	Radiation treatment delivery, > 1 MeV; complex
G6003	Radiation treatment delivery, single treatment area, single port or parallel opposed ports, simple blocks or no blocks: up to 5 MeV
G6004	Radiation treatment delivery, single treatment area, single port or parallel opposed ports, simple blocks or no blocks: 6-10 MeV
G6005	Radiation treatment delivery, single treatment area, single port or parallel opposed ports, simple blocks or no blocks: 11-19 MeV
G6006	Radiation treatment delivery, single treatment area, single port or parallel opposed ports, simple blocks or no blocks: 20 MeV or greater
G6007	Radiation treatment delivery, 2 separate treatment areas, 3 or more ports on a single treatment area, use of multiple blocks: up to 5 MeV
G6008	Radiation treatment delivery, 2 separate treatment areas, 3 or more ports on a single treatment area, use of multiple blocks: 6-10 MeV
G6009	Radiation treatment delivery, 2 separate treatment areas, 3 or more ports on a single treatment area, use of multiple blocks: 11-19 MeV
G6010	Radiation treatment delivery, 2 separate treatment areas, 3 or more ports on a single treatment area, use of multiple blocks: 20 MeV or greater
G6011	Radiation treatment delivery, 3 or more separate treatment areas, custom blocking, tangential ports, wedges, rotational beam, compensators, electron beam; up to 5 MeV
G6012	Radiation treatment delivery, 3 or more separate treatment areas, custom blocking, tangential ports, wedges, rotational beam, compensators, electron beam; 6-10 MeV
G6013	Radiation treatment delivery, 3 or more separate treatment areas, custom blocking, tangential ports, wedges, rotational beam, compensators, electron beam; 11-19 MeV
G6014	Radiation treatment delivery, 3 or more separate treatment areas, custom blocking, tangential ports, wedges, rotational beam, compensators, electron beam; 20 MeV or greater

Brachytherapy

CPT/HCPCS

77295	3-dimensional radiotherapy plan, including dose-volume histograms
77316	Brachytherapy isodose plan; simple (1-4 sources or 1 channel), includes basic dosimetry calculations (Do not bill 77300)

77317	Brachytherapy isodose plan; intermediate (5-10 sources or 2-12 channels), includes basic dosimetry calculation (Do not bill 77300)
77318	Brachytherapy isodose plan; complex (over 10 sources or over 12 channels), includes basic dosimetry calculations (Do not bill 77300)
77370	Special medical radiation physics consultation
77470	Special treatment procedure
77771	Remote afterloading high dose rate radionuclide interstitial or intracavitary brachytherapy, includes basic dosimetry, when performed; 2-12 channels
77772	Remote afterloading high dose rate radionuclide interstitial or intracavitary brachytherapy, includes basic dosimetry, when performed; over 12 channels
0394T	HDR electronic brachytherapy, skin surface application, per fraction
0395T	HDR electronic brachytherapy, interstitial or intracavitary treatment, per fraction

Intensity Modulated Radiation Therapy

CPT/HCPCS

77301	Intensity modulated radiation therapy plan, including dose volume histogram for target and critical structure partial tolerance specifications (IMRT treatment plan)
77338	Multi-leaf collimator (MLC) device(s) for intensity modulated radiation therapy (IMRT), design and construction per IMRT plan
77385	Intensity modulated radiation treatment delivery (IMRT), includes guidance and tracking when performed; Simple (includes breast cancer, prostate cancer and compensator-based IMRT)
G6015	Intensity modulated Treatment delivery, single or multiple fields/arcs, via narrow spatially and temporally modulated beams, binary, dynamic MLC, per treatment session
G6016	Compensator-based beam modulation treatment delivery of inverse planned treatment using 3 or more high resolution (milled or cast) compensator convergent beam modulated fields, per treatment session

All Modalities

ICD-10 Diagnoses

C43.0 - C43.9	Malignant melanoma
C44.0 – C44.99	Other and unspecified malignant neoplasm of skin
Z85.820	Personal history of malignant melanoma of skin

References

1. Likhacheva, A, Awan, M, Barker, CA, et al. Definitive and postoperative radiation therapy for basal and squamous cell cancers of the skin: executive summary of an American Society for Radiation Oncology clinical practice guideline. *Pract Radiat Oncol*. 2020;10(1):8-20.
2. NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines®) for Basal Cell Skin Cancer (Version 1.2020). Available at <http://www.nccn.org>. ©National Comprehensive Cancer Network, 2020
3. NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines®) for Cutaneous Melanoma (Version 3.2020). Available at <http://www.nccn.org>. ©National Comprehensive Cancer Network, 2020.
4. NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines®) for Squamous Cell Skin Cancer (Version 1.2020). Available at <http://www.nccn.org>. ©National Comprehensive Cancer Network, 2020.)
5. Nestor, MS, Berman, B, Goldberg, D, et al. Consensus guidelines on the use of superficial radiation therapy for treating nonmelanoma skin cancers and keloids. *J Clin Aesthet Dermatol*. 2019;12(2):12-8.
6. Patel, R, Strimling, R, Doggett, S, et al. Comparison of electronic brachytherapy and Mohs micrographic surgery for the treatment of early-stage non-melanoma skin cancer: a matched pair cohort study. *J Contemp Brachytherapy*. 2017;9(4):338-44.
7. Tom, MC, Hepel, JT, Patel, R, et al. The American Brachytherapy Society consensus statement for electronic brachytherapy. *Brachytherapy*. 2019;18(3):292-8.

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These Guidelines are a work in progress that may be refined as often as new significant data becomes available.

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Appendix. Procedure Code Groupers

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Grouper Type	Grouper ID	Grouper Name	Grouper included on order when submitted Dx/Anatomy	Included Codes	Qty Sent
3D Conformal (EBRT)					
P	77402	Fraction	N/A	G6003, G6004, G6005, G6006, G6007, G6008, G6009, G6010, G6011, G6012, G6013, G6014, 77401, 77402, 77407, 77412	n
A/C	77295		N/A	77295	c
Brachytherapy					
P	77761	Delivery	N/A	76965, 77761, 77762, 77763, 77767, 77768, 77770, 77771, 77772, 77778	12
C	77790	Handling	N/A	77790	5
C	77316	Isodose Calc	N/A	77316, 77317, 77318	5
C	Q3001	Handling	N/A	Q3001	n
A	43499		Esophagus (esophageal tumor)	43499	2
A	47999		Biliary tract (cholangiocarcinoma)	47999	2
A	55899		Penile tumor	55899	2
A	67218		Retina	67218	2
A	19296		Breast	19296, 19297, 19298	2
A	20555		Muscle and/or soft tissue	20555	2
A	41019		Head and/or neck region (percutaneous, transoral, or transnasal)	41019	2
A	55860		Prostate	55860, 55862, 55865, 55875, 76873, G0458	2
A	55920		Pelvic organs and/or genitalia (except prostate)	55920	3
A	31643		Bronchoscopy	31643	2
A	57155		Uterine tandems and/or vaginal ovoids, Heyman capsules, vaginal radiation afterloading apparatus	57155, 57156, 58346	5
Image Guided Radiation Therapy (IGRT)					
P	77387	IGRT	N/A	77387, G6001, G6002, G6017, 77014	c
Intensity Modulated Radiation Therapy (IMRT)					
P	77385	Delivery	N/A	77385, 77386, G6015, G6016	n
C	77301	Planning	N/A	77301	2
C	77338	MLC	N/A	77338	3
Intraoperative Radiation Therapy (IORT)					

Grouper Type	Grouper ID	Grouper Name	Grouper included on order when submitted Dx/Anatomy	Included Codes	Qty Sent
P	77424		N/A	77424, 77425	1
C	77469		N/A	77469, 19294	2
Proton Beam Therapy (PBT)					
P	77520	Delivery	N/A	77520, 77522, 77523, 77525	n
C	61796		N/A	61796, 61797, 61798, 61799	5
C	63620		N/A	63620, 63621	5
C	61800		N/A	61800	3
C	77432		N/A	77432	5
C	77435		N/A	77435	5
C	58030		N/A	58030	5
C	77301		N/A	77301, 77338, 77295	2
Stereotactic Body Radiation Therapy (SBRT)					
P	77373	Delivery	N/A	77373, G0339, G0340	n
C	63620		N/A	63620, 63621	5
C	77435		N/A	77435, 32701	5
C	77301		N/A	77301, 77338, 77295	2
Stereotactic Radiosurgery (SRS)					
P	77371	Delivery	N/A	77371, 77372, G0339, G0340	n
C	61796		N/A	61796, 61797, 61798, 61799	5
C	61800		N/A	61800	3
C	77432		N/A	77432, 77435	5
C	77301		N/A	77301, 77338, 77295	2
Special Physics Consult					
P	77370	Special radiation physics consult	N/A	77370	1
Special Treatment					
P	77470	Special radiation treatment	N/A	77470	1
Electronic Brachytherapy - Skin					
P	0394T	Delivery	N/A	0394T, 0395T	n
Hyperthermia					
P	77600	Delivery	N/A	77600, 77605	n
C	77610		N/A	77610, 77615, 77620	n
Neutron					
P	77423	Delivery	N/A	77423	n

Grouper Types: P, Primary; C, Common; A, Associated

Notes: When criteria are met for the primary grouper (Grouper Type P), all of the included codes are passed on the extract with the associated quantity. Any of the included codes may be billed up to the specified total quantity limit. Codes listed in Grouper Type C are also included in the extract. Associated codes (Grouper Type A) are included only for specific anatomic sites as listed.

History

Status	Review Date	Effective Date	Action
Archived	n/a	03/14/2021	Archived.
Revised	07/08/2020	01/01/2021	Independent Multispecialty Physician Panel (IMPP) review. Added new criteria and discussion for Skin cancer. Revised criteria for Breast cancer and Gynecologic cancer to address inclusion of electronic brachytherapy and hyperthermia. Added criteria for neutron therapy to treat primary salivary cancer. Added CPT codes 77401, 77600, 77605, 77610, 77615, 77620, 77423, 0394T, 0395T.
Revised	05/27/2020	01/01/2021	IMPP review. Revised criteria for Special treatment procedure, CNS cancer, Lung cancer, Lymphoma, and Prostate cancer. Revised fractionation for Non-small cell lung cancer. Added discussion for IGRT, Bone metastases, Breast cancer, CNS cancers, Gastrointestinal cancers, Gynecologic cancers, Lung cancer, Oligometastatic extracranial disease, and Prostate cancer. Removed all references to Karnofsky performance status.
Revised	06/10/2019	02/09/2020	IMPP review. Added new criteria and discussion for Oligometastatic extracranial disease. Revised criteria for Special treatment procedure, Bone metastases, Head and neck cancer, and Prostate cancer (added Hydrogel spacer as not medically necessary). Revised fractionation for Bone metastases and Prostate cancer. Added discussion for CNS cancers and Prostate cancer. Added Appendix with procedure code groupers.
Revised	07/11/2018	03/09/2019	IMPP review. Added the General Clinical Guideline.
Revised	05/01/2018	01/27/2019	IMPP review. Revised criteria for Breast cancer, Rectal cancer, Pancreatic cancer, Head and neck cancer, Lung cancer, Sarcoma. Added discussion for Prostate cancer.
Revised	11/01/2016	02/20/2017	IMPP review. Added fractionation for lung cancer.
Revised	07/26/2016	10/31/2016	IMPP review. Revised criteria for IGRT, Special treatment procedure and special physics consult, Intracranial lesions, Cholangiocarcinoma, Gastric cancer, Liver cancer, Pancreatic cancer, Bladder cancer, and Prostate cancer. Added IORT codes for Breast cancer.
Revised	08/27/2015	01/01/2016	IMPP review. Revised criteria for Breast cancer. Added new criteria for IGRT, Special treatment procedure and special physics consult, and Bone metastases.
Created	05/14/2014	11/03/2014	IMPP review. Original effective date.