Medical Coverage Policy | Intensity-Modulated Radiotherapy: Head, Neck and Thyroid

EFFECTIVE DATE: 12|01|2022
POLICY LAST UPDATED: 08|17|2022

OVERVIEW

Radiotherapy (RT) is an integral component in the treatment of head and neck cancers. Intensity-modulated radiotherapy (IMRT) has been proposed as a method of RT that allows adequate RT to the tumor minimizing the radiation dose to surrounding normal tissues and critical structures.

MEDICAL CRITERIA

Medicare Advantage Plans and Commercial Products

Intensity-modulated radiotherapy may be considered medically necessary for the treatment of the following head and neck cancers:

- oral cavity and lip
- larynx,
- hypopharynx
- oropharynx
- nasopharynx
- paranasal sinuses and nasal cavity
- salivary glands
- occult primaries in the head and neck region.

Intensity-modulated radiotherapy may be considered medically necessary for the treatment of thyroid cancers when the criteria below is met:

- Tumor is in close proximity to organs at risk (esophagus, salivary glands, and spinal cord), AND;
- When 3-dimensional conformal radiation therapy (3D-CRT) planning is not able to meet dose volume constraints for normal tissue tolerance.

PRIOR AUTHORIZATION

Prior authorization is required for Medicare Advantage Plans and recommended for Commercial Products via the online tool for participating providers. See the Related Policies section.

POLICY STATEMENT

Medicare Advantage Plans and Commercial Products

Intensity-modulated radiotherapy may be considered medically necessary for the treatment of head and neck cancers for the treatment of thyroid cancers when the criteria above is met.

Intensity-modulated radiotherapy is not covered for Medicare Advantage Plans and not medically necessary for Commercial Products for the treatment of thyroid cancers not noted above as evidence is insufficient to determine the effects of the technology on health outcomes.

COVERAGE

Benefits may vary between groups and contracts. Please refer to the appropriate Benefit Booklet, Evidence of Coverage, or Subscriber Agreement for applicable radiology benefits/coverage.

BACKGROUND

Head and Neck Cancers

This evidence review focuses on cancers affecting the oral cavity and lip, larynx, hypopharynx, oropharynx, nasopharynx, paranasal sinuses and nasal cavity, salivary glands, and occult primaries in the head and neck region.

Radiotherapy Techniques

Conventional External Beam Radiotherapy

Methods to plan and deliver radiotherapy (RT) have evolved in ways that permit more precise targeting of tumors with complex geometries. Most early trials used 2-dimensional treatment planning based on flat images and radiation beams with cross-sections of uniform intensity that were sequentially aimed at the tumor along 2 or 3 intersecting axes. Collectively, these methods are termed conventional external-beam radiotherapy.

Three-Dimensional Conformal Radiation

Treatment planning evolved by using 3D images, usually from computed tomography (CT) scans, to delineate the boundaries of the tumor and discriminate tumor tissue from adjacent normal tissue and nearby organs at risk for radiation damage. Computer algorithms were developed to estimate cumulative radiation dose delivered to each volume of interest by summing the contribution from each shaped beam. Methods also were developed to position the patient and the radiation portal reproducibly for each fraction and immobilize the patient, thus maintaining consistent beam axes across treatment sessions. Collectively, these methods are termed 3D-CRT.

Intensity-Modulated Radiotherapy

Intensity-modulated radiotherapy (IMRT), which uses computer software and CT and magnetic resonance imaging images, offers better conformality than 3D-CRT because it modulates the intensity of the overlapping radiation beams projected on the target and uses multiple shaped treatment fields. Treatment planning and delivery are more complex, time-consuming, and labor-intensive for IMRT than for 3D-CRT. The technique uses a multileaf collimator [MLC]), which, when coupled with a computer algorithm, allows for "inverse" treatment planning. The radiation oncologist delineates the target on each slice of a CT scan and specifies the target's prescribed radiation dose, acceptable limits of dose heterogeneity within the target volume, adjacent normal tissue volumes to avoid, and acceptable dose limits within the normal tissues. Based on these parameters and a digitally reconstructed radiographic image of the tumor, surrounding tissues, and organs at risk, computer software optimizes the location, shape, and intensities of the beam ports to achieve the treatment plan's goals.

Increased conformality may permit escalated tumor doses without increasing normal tissue toxicity and thus may improve local tumor control, with decreased exposure to surrounding, normal tissues, potentially reducing acute and late radiation toxicities. Better dose homogeneity within the target may also improve local tumor control by avoiding underdosing within the tumor and may decrease toxicity by avoiding overdosing.

Technologic developments have produced advanced techniques that may further improve RT treatment by improving dose distribution. These techniques are considered variations of IMRT. Volumetric modulated arc therapy delivers radiation from a continuously rotating radiation source. The principal advantage of volumetric modulated arc therapy is greater efficiency in treatment delivery time, reducing radiation exposure and improving target radiation delivery due to less patient motion. Image-guided RT involves the incorporation of imaging before and/or during treatment to deliver RT to the target volume more precisely.

IMRT methods to plan and deliver RT are not uniform. IMRT may use beams that remain on as MLCs move around the patient (dynamic MLC), or that are off during movement and turn on once the MLC reaches prespecified positions ("step and shoot" technique). A third alternative uses a very narrow single beam that moves spirally around the patient (tomotherapy). Each method uses different computer algorithms to plan treatment and yields somewhat different dose distributions in and outside the target. Patient position can alter target shape and thus affect treatment plans. Treatment plans are usually based on a single imaging scan, a

static 3D-CT image. Current methods seek to reduce positional uncertainty for tumors and adjacent normal tissues by various techniques. Patient immobilization cradles and skin or bony markers are used to minimize day-to-day variability in patient positioning. In addition, many tumors have irregular edges that preclude drawing tight margins on CT scan slices when radiation oncologists contour the tumor volume. It is unknown whether omitting some tumor cells or including some normal cells in the resulting target affects outcomes of IMRT.

CODING

Medicare Advantage Plans and Commercial Products

A4648 Tissue marker, implantable, any type, each (Note: This code is not separately reimbursed for institutional providers.)

Note: To ensure correct pricing of HCPC code **A4648** for the Calypso 4D localization system, the procedure/clinical notes and the invoice must be submitted.

The following codes are covered for Medicare Advantage Plans and Commercial Products when the criteria above is met:

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

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

77385 Intensity modulated radiation treatment delivery (IMRT), includes guicance and tracking, when performed; simple (Institutional providers)

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

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

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: (Professional providers)

RELATED POLICIES

Preauthorization via Web-Based Tool for Procedures
Intensity Modulated Radiotherapy: Abdomen, Pelvis and Chest
Intensity Modulated Radiotherapy: Central Nervous System
Intensity Modulated Radiotherapy: Breast and Lung
Intensity Modulated Radiotherapy: Prostate

PUBLISHED

Provider Update, October 2022
Provider Update, November 2021
Provider Update, January 2021
Provider Update, October 2019
Provider Update, November/December 2018

REFERENCES

1. Shinohara E, Whaley JT. Radiation therapy: which type is right for me? University of Pennsylvania. OncoLink site. Reviewed March 3, 2020. https://www.oncolink.org/print/pdf/5965?print_5965.pdf. Accessed June 5, 2022.
2. American Society of Clinical Oncology. Cancer.Net site. Head and neck cancer: statistics. February 2022.https://www.cancer.net/cancer-types/head-and-neck-cancer/statistics. Accessed June 5, 2022.

3. Du T, Xiao J, Qiu Z, et al. The effectiveness of intensity-modulated radiation therapy versus 2D-RT for thetreatment of nasopharyngeal carcinoma: A systematic review and meta-analysis. PLoS One. 2019; 14(7):e0219611. PMID 31291379
4. Luo MS, Huang GJ, Liu HB. Oncologic outcomes of IMRT versus CRT for nasopharyngeal carcinoma: A meta-analysis. Medicine (Baltimore). Jun 2019; 98(24): e15951. PMID 31192932
5. Marta GN, Silva V, de Andrade Carvalho H, et al. Intensity-modulated radiation therapy for head and neck cancer:systematic review and meta-analysis. Radiother Oncol. Jan 2014; 110(1): 9-15. PMID 24332675
6. Kam MK, Leung SF, Zee B, et al. Prospective randomized study of intensity-modulated radiotherapy on salivary gland function in early-stage nasopharyngeal carcinoma patients. J Clin Oncol. Nov 01 2007; 25(31): 4873-9.PMID 17971582
7. Lai SZ, Li WF, Chen L, et al. How does intensity-modulated radiotherapy versus conventional two-dimensional radiotherapy influence the treatment results in nasopharyngeal carcinoma patients?. Int J Radiat Oncol Biol Phys. Jul 01 2011; 80(3): 661-8. PMID 20643517
8. Peng G, Wang T, Yang KY, et al. A prospective, randomized study comparing outcomes and toxicities of intensity-modulated radiotherapy vs. conventional two-dimensional radiotherapy for the treatment of nasopharyngeal carcinoma. Radiother Oncol. Sep 2012; 104(3): 286-93. PMID 22995588
9. Zhou GQ, Yu XL, Chen M, et al. Radiation-induced temporal lobe injury for nasopharyngeal carcinoma: a comparison of intensity-modulated radiotherapy and conventional two-dimensional radiotherapy. PLoS One. 2013;8(7): e67488. PMID 23874422
10. Moon SH, Cho KH, Lee CG, et al. IMRT vs. 2D-radiotherapy or 3D-conformal radiotherapy of nasopharyngeal carcinoma : Survival outcome in a Korean multi-institutional retrospective study (KROG 11-06). Strahlenther Onkol.Jun 2016; 192(6): 377-85. PMID 26972085
11. Zhang MX, Li J, Shen GP, et al. Intensity-modulated radiotherapy prolongs the survival of patients with nasopharyngeal carcinoma compared with conventional two-dimensional radiotherapy: A 10-year experience with a large cohort and long follow-up. Eur J Cancer. Nov 2015; 51(17): 2587-95. PMID 26318726
12. Qiu WZ, Peng XS, Xia HQ, et al. A retrospective study comparing the outcomes and toxicities of intensity-modulated radiotherapy versus two-dimensional conventional radiotherapy for the treatment of children and adolescent nasopharyngeal carcinoma. J Cancer Res Clin Oncol. Aug 2017; 143(8): 1563-1572. PMID 28342002
13. Tang LL, Chen L, Mao YP, et al. Comparison of the treatment outcomes of intensity-modulated radiotherapy and two-dimensional conventional radiotherapy in nasopharyngeal carcinoma patients with parapharyngeal space extension. Radiother Oncol. Aug 2015; 116(2): 167-73. PMID 26316395
14. Lee AW, Ng WT, Chan LL, et al. Evolution of treatment for nasopharyngeal cancer--success and setback in the intensity-modulated radiotherapy era. Radiother Oncol. Mar 2014; 110(3): 377-84. PMID 24630534
15. Zhong H, Chen G, Lin D, et al. [Comparison of side effects of intensity modulated radiotherapy and conventional radiotherapy in 69 cases with nasopharyngeal carcinoma]. Lin Chung Er Bi Yan Hou Tou Jing Wai Ke Za Zhi. May2013; 27(9): 462-4. PMID 23898610
16.
OuYang PY, Shi D, Sun R, et al. Effect of intensity-modulated radiotherapy versus two-dimensional conventional radiotherapy alone in nasopharyngeal carcinoma. Oncotarget. May 31 2016; 7(22): 33408-17. PMID 27058901
17. Jiang H, Wang G, Song H, et al. Analysis of the efficacy of intensity-modulated radiotherapy and two-dimensional conventional radiotherapy in nasopharyngeal carcinoma with involvement of the cervical spine. Oncol Lett. Nov2015; 10(5): 2731-2738. PMID 26722233
18. Fang FM, Chien CY, Tsai WL, et al. Quality of life and survival outcome for patients with nasopharyngeal carcinoma receiving three-dimensional conformal radiotherapy vs. intensity-modulated radiotherapy-a longitudinal study. Int J Radiat Oncol Biol Phys. Oct 01 2008; 72(2): 356-64. PMID 18355980
19. Kuang WL, Zhou Q, Shen LF. Outcomes and prognostic factors of conformal radiotherapy versus intensity-modulated radiotherapy for nasopharyngeal carcinoma. Clin Transl Oncol. Oct 2012; 14(10): 783-90. PMID22855156

20. Huang HI, Chan KT, Shu CH, et al. T4-locally advanced nasopharyngeal carcinoma: prognostic influence of cranial nerve involvement in different radiotherapy techniques. ScientificWorldJournal. 2013; 2013: 439073. PMID24385882
21. Chen C, Yi W, Gao J, et al. Alternative endpoints to the 5-year overall survival and locoregional control for nasopharyngeal carcinoma: A retrospective analysis of 2,450 patients. Mol Clin Oncol. May 2014; 2(3): 385-392.PMID 24772305
22. Zou X, Han F, Ma WJ, et al. Salvage endoscopic nasopharyngectomy and intensity-modulated radiotherapy versus conventional radiotherapy in treating locally recurrent nasopharyngeal carcinoma. Head Neck. Aug 2015; 37(8):1108-15. PMID 24764204
23. Bisof V, Rakusic Z, Bibic J, et al. Comparison of intensity modulated radiotherapy with simultaneous integrated boost (IMRT-SIB) and a 3-dimensional conformal parotid gland-sparing radiotherapy (ConPas 3D-CRT) in treatment of nasopharyngeal carcinoma: a mono-institutional experience. Radiol Med. Mar 2018; 123(3): 217-226.PMID 29094268
24. Pow EH, Kwong DL, McMillan AS, et al. Xerostomia and quality of life after intensity-modulated radiotherapy vs. conventional radiotherapy for early-stage nasopharyngeal carcinoma: initial report on a randomized controlled clinical trial. Int J Radiat Oncol Biol Phys. Nov 15 2006; 66(4): 981-91. PMID 17145528
25. Nutting CM, Morden JP, Harrington KJ, et al. Parotid-sparing intensity modulated versus conventional radiotherapy in head and neck cancer (PARSPORT): a phase 3 multicentre randomised controlled trial. Lancet Oncol. Feb 2011;12(2): 127-36. PMID 21236730
26. Gupta T, Jain S, Agarwal JP, et al. Prospective assessment of patterns of failure after high-precision definitive(chemo)radiation in head-and-neck squamous cell carcinoma. Int J Radiat Oncol Biol Phys. Jun 01 2011; 80(2):522-31. PMID 20646862
27. Gupta T, Agarwal J, Jain S, et al. Three-dimensional conformal radiotherapy (3D-CRT) versus intensity modulated radiation therapy (IMRT) in squamous cell carcinoma of the head and neck: a randomized controlled trial. Radiother Oncol. Sep 2012; 104(3): 343-8. PMID 22853852
28.
Ursino S, D'Angelo E, Mazzola R, et al. A comparison of swallowing dysfunction after three-dimensional conformaland intensity-modulated radiotherapy: A systematic review by the Italian Head and Neck Radiotherapy Study Group. Strahlenther Onkol. Nov 2017; 193(11): 877-889. PMID 28616822
29. Ge X, Liao Z, Yuan J, et al. Radiotherapy-related quality of life in patients with head and neck cancers: a meta-analysis. Support Care Cancer. Jun 2020; 28(6): 2701-2712. PMID 31673782
30. Tandon S, Gairola M, Ahlawat P, et al. Randomized controlled study comparing simultaneous modulated accelerated radiotherapy versus simultaneous integrated boost intensity modulated radiotherapy in the treatment of locally advanced head and neck cancer. J Egypt Natl Canc Inst. Sep 2018; 30(3): 107-115. PMID 29960876
31. Huang TL, Chien CY, Tsai WL, et al. Long-term late toxicities and quality of life for survivors of nasopharyngeal carcinoma treated with intensity-modulated radiotherapy versus non-intensity-modulated radiotherapy. Head Neck. Apr 2016; 38 Suppl 1: E1026-32. PMID 26041548
32. American Thyroid Association. Anaplastic thyroid cancer. https://www.thyroid.org/anaplastic-thyroid-cancer/.Accessed June 5, 2022.
33. Bhatia A, Rao A, Ang KK, et al. Anaplastic thyroid cancer: Clinical outcomes with conformal radiotherapy. Head Neck. Jul 2010; 32(7): 829-36. PMID 19885924

34. Schwartz DL, Lobo MJ, Ang KK, et al. Postoperative external beam radiotherapy for differentiated thyroid cancer: outcomes and morbidity with conformal treatment. Int J Radiat Oncol Biol Phys. Jul 15 2009; 74(4): 1083-91. PMID19095376
35. National Comprehensive Cancer Network (NCCN). NCCN Clinical practice guidelines in oncology: Head and Neck Cancers. Version 2.2022. Updated April 26, 2022.
https://www.nccn.org/professionals/physician_gls/pdf/head-and-neck.pdf Accessed June 5, 2022.

36. National Comprehensive Cancer Network (NCCN). NCCN Clinical practice guidelines in oncology: Thyroid Carcinoma. Version 2.2022. Updated May 5, 2022.https://www.nccn.org/professionals/physician_gls/pdf/thyroid.pdf. Accessed June 5, 2022.
37. Bible KC, Kebebew E, Brierley J, et al. 2021 American Thyroid Association Guidelines for Management of Patients with Anaplastic Thyroid Cancer. Thyroid. Mar 2021; 31(3): 337-386. PMID 33728999

CLICK THE ENVELOPE ICON BELOW TO SUBMIT COMMENTS