Radiotherapy Guideline for Cervical Cancer

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RT indication

- Definitive therapy: locally advanced disease or for those who are poor surgical candidates: patients with stage IB2, IIA2, or advanced-stage tumors. Contemporary imaging studies must be correlated with careful assessment of clinical findings to define tumor extent, especially with regard to vaginal or parametrial extension.
- Adjuvant therapy: following radical hysterectomy for those who have one or more pathologic risk factors (eg, positive lymph nodes, parametrial infiltration, positive surgical margins, large tumor size, deep stromal invasion, LVSI).
- Brain metastases should typically be treated with WBRT; however, selected patients with a small number of metastases may be appropriately treated with stereotactic radiotherapy (SRT)/radiosurgery (SRS).
- RT is recommended for local palliation or prevention of symptoms (such as pain, bleeding, or obstruction).

Simulation and immobilization

- CT-based treatment planning with conformal blocking and dosimetry is considered standard care for EBRT.
- Brachytherapy is a critical component of definitive therapy in patients with cervical cancer who are not candidates for surgery (ie, those with an intact cervix); it may also be used as adjuvant therapy. Brachytherapy is typically combined with EBRT in an integrated treatment plan. MRI imaging immediately preceding brachytherapy may be helpful in delineating residual tumor geometry.
- Multiple conformal fields based on CT-treatment planning should be utilized, and consideration for IMRT for normal tissue sparing may be considered, with appropriate attention to QA and tissue interfraction mobility.

Field design and treatment volume

- Target volumes for 3D-RT and IMRT.

- GTV comprises the known extent of disease (primary and nodal) on imaging and pathologic assessment, CTV includes regions of presumed microscopic extent or dissemination, and PTV comprises the ITV (which includes margin for target motion) plus a setup margin for positioning and mechanical variability.
- Point A, representing a paracervical reference point
- Pelvic radiotherapy should target the gross disease (if present), the lower common iliacs, external iliacs, internal iliacs, obturators, parametria, upper vagina/para-vaginal tissue, and presacral lymph nodes.
- Extended-field radiotherapy should include the pelvic volume and also target the entire common iliac chain and para-aortic lymph node region. The upper border of the extended field depends on the clinical situation but should at least be 1–2 cm above the level of the renal vessels.
- For lesions in the lower one third of the vagina, the inguinal lymph nodes must be treated.
- Pelvic tissues at risk, especially in the post-hysterectomy setting, can be highly variable depending on bowel and bladder filling. In this situation, the integrated target volume (ITV), which encompasses the range of organ movement and deformation, is considered the clinical target volume (CTV), and should be fully covered in the treatment volume.

Dose prescriptions

- Coverage of microscopic nodal disease requires an EBRT dose of approximately 40–45 Gy (in conventional fractionation of 1.8–2.0 Gy daily possibly with an SIB if IMRT is used), and highly conformal boosts of an additional 10–20 Gy may be considered for limited volumes of gross unresected adenopathy, with consideration of the dose given by brachytherapy.
- The primary cervical tumor is then boosted, using brachytherapy, with an additional 30 to 40 Gy using either image guidance (preferred) or to point A (in low dose-rate [LDR] equivalent dose), for a total point A dose (as recommended in the guidelines) of 80 Gy for small-volume cervical tumors or ≥85 Gy for larger-volume cervical tumors. For very small tumors (medically inoperable IA1 or IA2 EQD2 D90 doses of 75–80 Gy may be considered). Grossly involved unresected nodes may be evaluated for boosting with an additional 10 to 15 Gy of highly conformal (and reduced-volume) EBRT.
- Following primary hysterectomy, the presence of one or more pathologic risk factors may warrant the use of adjuvant radiotherapy. At a minimum, the following should be covered: upper 3 to 4 cm of the vaginal cuff, the parametria, and immediately adjacent nodal basins (such as the external and internal iliacs,

obturator and presacral nodes). For documented nodal metastasis, the superior border of the radiation field should be appropriately increased (as previously described). A dose of 45 to 50 Gy in standard fractionation with IMRT is generally recommended.

- Grossly involved unresected nodes may be evaluated for boosting with an additional 10 to 20 Gy of highly conformal (and reduced-volume) EBRT.
- WBRT is 30 Gy in 10 daily fractions. For patients with a better prognosis (eg, ≥4 months), consider hippocampal-sparing WBRT using IMRT.
- Common radiation dose-fractionation regimens (eg, 30 Gy in 10 fractions, 20 Gy in 5 fractions, 8 Gy in 1 fraction) used for palliation of other solid tumors are appropriate for palliation of metastases in most patients.

Constraints for organ at risk

- Normal organ dose responses from the QUANTEC project.

Reference

- NCCN Practice Guidelines in Oncology, 2024
- Perez and Brady's : Principles and Practice of Radiation Oncology, 7th ed, 2018
- Eric K. Hansen, Handbook of Evidence-Based Radiation Oncology