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Radiotherapy Guideline for Cervical Cancer

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(2023.10 第八版)
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本版與上一版的差異:

(2024.09 第九版)	(2025.12 第十版)
Definitive RT 是否合併化療 未明確指出多數需 concurrent chemotherapy	**Definitive RT 是否合併化療** 明確指出 definitive EBRT 通常合併 concurrent platinum-containing chemotherapy（cisplatin preferred）
適應症期別描述 IB2、IIA2、advanced stage	**適應症期別描述** FIGO IB3–IVA 為標準 CCRT 對象；IA–IB2 僅限 medically inoperable
IMRT 的角色定位 IMRT 為可考慮選項	**IMRT 的角色定位** IMRT + IGRT 為首選（preferred），definitive 與 post-op 皆適用
IGRT 使用 未明確強調	**IGRT 使用** 強調每日 IGRT（CBCT/orthogonal imaging）
Brachytherapy 是否可被取代 未清楚限制	**Brachytherapy 是否可被取代** IMRT / SBRT 不可常規取代 brachytherapy（intact cervix）
Brachytherapy 劑量表述 以 Point A dose 為主	**Brachytherapy 劑量表述** 明確指出 definitive EBRT 通常合併 concurrent platinum-containing chemotherapy（cisplatin preferred）
HR-CTV 劑量建議 80 / ≥85 Gy 分散描述	**HR-CTV 劑量建議** FIGO IB3–IVA 為標準 CCRT 對象；IA–IB2 僅限 medically inoperable
Nodal boost 劑量 10–20 Gy（概念性）	**Nodal boost 劑量** IMRT + IGRT 為首選（preferred），definitive 與 post-op 皆適用

1. Indications for Radiation Therapy

Radiation therapy (RT) plays a central role in the management of cervical cancer and is used either as definitive therapy or as adjuvant therapy following surgery.

Definitive RT is recommended for patients with locally advanced disease (FIGO stage IB3–IVA), or for patients who are medically inoperable or poor surgical candidates (including selected stage IA–IB2 cases). Definitive treatment generally consists of

pelvic external beam radiation therapy (EBRT) combined with brachytherapy, and is typically delivered with concurrent platinum-containing chemotherapy (cisplatin preferred).

Adjuvant RT is recommended following radical hysterectomy in patients with pathologic risk factors, including positive lymph nodes, parametrial involvement, positive surgical margins, or intermediate-risk features meeting GOG/Sedlis criteria.

2. Simulation and Treatment Planning

CT-based simulation is considered standard for EBRT planning. Image fusion with MRI and/or FDG-PET/CT is strongly recommended to improve target delineation, particularly for assessment of the primary tumor and nodal disease.

Intensity-modulated radiation therapy (IMRT) with image-guided radiation therapy (IGRT) is preferred to reduce gastrointestinal, genitourinary, and hematologic toxicity, both in the definitive and postoperative settings. Daily image guidance using orthogonal imaging or volumetric imaging (e.g., cone-beam CT) is strongly recommended.

Internal target volume (ITV) considerations should account for uterine, cervical, vaginal, bladder, and bowel motion. Bladder filling protocols and, when appropriate, full and empty bladder scans may be used to assist ITV generation.

3. Target Volumes and Field Design

Gross tumor volume (GTV) includes the gross primary tumor and any radiographically or pathologically involved lymph nodes. Clinical target volume (CTV) encompasses areas at risk for microscopic disease, and planning target volume (PTV) includes margins for setup uncertainty and internal motion.

Standard pelvic CTV includes the cervix or vaginal cuff (as appropriate), parametria, uterus (if intact), upper vagina, and regional lymphatics including obturator, internal iliac, external iliac, presacral, and distal common iliac nodes.

Extended-field radiation therapy should include para-aortic lymph nodes when nodal involvement is identified by imaging or pathology, or in selected high-risk cases. The superior border should extend at least 1–2 cm above the renal vessels.

For tumors involving the distal one-third of the vagina, inguinal lymph nodes should be included in the radiation field.

4. Dose Prescription – External Beam Radiation Therapy

For definitive treatment, pelvic EBRT is typically delivered to a dose of 45–50.4 Gy in 1.8–2.0 Gy fractions. Coverage of microscopic nodal disease generally requires 40–45 Gy.

Grossly involved lymph nodes may receive a boost to a total dose of approximately 54–63 Gy using highly conformal techniques, such as IMRT with simultaneous integrated boost (SIB), while respecting organ-at-risk constraints.

Concurrent platinum-containing chemotherapy (cisplatin preferred; carboplatin if cisplatin-intolerant) should be administered during EBRT for the majority of patients receiving definitive radiation.

5. Brachytherapy

Brachytherapy is a critical and mandatory component of definitive radiation therapy for patients with an intact cervix and should not be replaced by conformal EBRT techniques such as IMRT or SBRT.

Image-guided adaptive brachytherapy (IGABT), preferably MRI-based, is strongly recommended. Dose prescription should be based on EQD2 calculations to the high-risk clinical target volume (HR-CTV).

Recommended cumulative doses (EBRT + brachytherapy) are:
• HR-CTV D90 EQD2 ≥80 Gy for small-volume tumors
• HR-CTV D90 EQD2 ≥85 Gy for large-volume tumors
• For very small tumors (e.g., medically inoperable stage IA1–IA2), EQD2 doses of 75–80 Gy may be considered.

For postoperative cases with close or positive vaginal margins, vaginal cuff brachytherapy boost may be considered.

6. Adjuvant Radiation Therapy

In the postoperative setting, adjuvant pelvic RT is typically delivered to 45–50 Gy using IMRT. Target volumes should include the vaginal cuff (upper 3–4 cm), parametria, and regional pelvic lymph nodes.

Patients with positive pelvic lymph nodes, positive margins, or parametrial involvement should receive EBRT with concurrent platinum-containing chemotherapy. Extended-field RT is indicated when para-aortic lymph nodes are

involved.

Gross residual or unresected nodal disease may receive an additional conformal boost of 10–20 Gy.

7. Immunotherapy Integration

For selected patients with FIGO stage IIB–IVA disease, the addition of concurrent and maintenance pembrolizumab to definitive chemoradiation may be considered in accordance with NCCN Guidelines Version 2.2026 (category 1 for FIGO 2014 stage III–IVA; category 2B for select FIGO 2018 stage III–IVA cases).

8. Normal Tissue Dose Constraints

A.Radiation planning should adhere to normal tissue dose constraints as outlined in the NCCN Version 2.2026(CERV-D) guidelines. Key organs at risk include bladder, rectum, sigmoid colon, small bowel, bone marrow, kidneys, spinal cord, and duodenum. When constraints cannot be met, adaptive planning or interstitial brachytherapy techniques should be considered.

B. Normal organ dose responses from the QUANTEC project.

9. Palliative Radiation Therapy

RT is effective for palliation of symptoms such as pain, bleeding, or obstruction. Commonly used regimens include 30 Gy in 10 fractions, 20 Gy in 5 fractions, or 8 Gy in a single fraction.

For brain metastases, whole-brain radiation therapy (WBRT) of 30 Gy in 10 fractions is standard, with consideration of hippocampal-sparing WBRT or stereotactic radiosurgery (SRS) in selected patients.

Reference

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4. Perez & Brady’s Principles and Practice of Radiation Oncology, 7th Edition.
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