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Radiotherapy Guideline for Endometrial Cancer

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本版與上一版的差異:

(2025.12 第十版)	(2024.09 第九版)
Stage I–II 放射治療決策 整合分子分類（POLE、MMRd、p53abn、NSMP）於 adjuvant RT 決策	**Stage I–II 放射治療決策** 依傳統臨床與病理風險因子
IMRT / IGRT 技術定位 IMRT + daily IGRT 為 EBRT 首選技術	**IMRT / IGRT 技術定位** IMRT 為可考慮選項
Vaginal brachytherapy 適應症 依 stage、grade、LVSI、年齡與分子風險精準化選擇	**Vaginal brachytherapy 適應症** 以傳統風險因子為主
Stage III–IVA 治療策略 Systemic therapy 為主，EBRT ± VBT 強化局部控制	**Stage III–IVA 治療策略** Systemic therapy ± EBRT ± VBT
Definitive RT（無法手術） EBRT ± brachytherapy，並明確系統治療角色	**Definitive RT（無法手術）** EBRT ± brachytherapy（簡述）
Oligometastatic disease RT 1–5 lesions 可考慮 ablative RT / SBRT（NCCN category 2B）	**Oligometastatic disease RT** 未明確描述
Brain metastases RT 優先考慮 SRS 或 hippocampal-sparing WBRT（視預後）	**Brain metastases RT** WBRT 或 SRS
OAR 劑量限制 依 NCCN UN-A normal tissue dose constraints（保留 QUANTEC 參考）	**OAR 劑量限制** 依 QUANTEC

1. Indications for Radiation Therapy

Radiation therapy (RT) is an integral component in the management of endometrial cancer and is primarily used in the adjuvant postoperative setting, as definitive therapy for medically inoperable patients, or for palliation of symptomatic disease.

For surgically staged stage I–II disease, decisions regarding adjuvant RT are based on a combination of clinicopathologic risk factors (grade, depth of myometrial invasion, LVSI, age, cervical involvement) and, increasingly, molecular classification (POLE-

mutated, MMRd, p53-abnormal, NSMP), in accordance with NCCN and international guidelines.

For stage III–IVA disease, systemic therapy constitutes the backbone of treatment, with EBRT with or without vaginal brachytherapy employed to improve locoregional control. For stage IVB disease, systemic therapy remains the mainstay, with RT reserved for consolidation or palliation.

2. Simulation and Treatment Planning

CT-based simulation is standard for EBRT planning. Image fusion with MRI and/or FDG-PET/CT should be considered to improve delineation of the vaginal cuff, pelvic nodal regions, and gross residual disease when present.

IMRT with daily image-guided radiation therapy (IGRT) is the preferred EBRT technique, allowing for improved target conformity and reduced dose to organs at risk, particularly bowel, bladder, rectum, and bone marrow.

Internal target volume (ITV) considerations are particularly important in the postoperative setting due to variability in bowel and bladder filling. Consistent bladder filling protocols and, when appropriate, full and empty bladder scans may be utilized.

3. Target Volumes and Field Design

The gross tumor volume (GTV) includes any gross residual disease identified on imaging or clinical examination. The clinical target volume (CTV) encompasses areas at risk for microscopic disease, including the vaginal cuff, parametrial tissues (if involved), and regional lymphatic basins.

Standard pelvic nodal CTV includes obturator, internal iliac, external iliac, presacral, and distal common iliac lymph nodes. Extended-field RT should include para-aortic lymph nodes when radiographically or pathologically involved, or in selected high-risk cases.

The planning target volume (PTV) incorporates margins to account for setup uncertainty and internal organ motion.

4. Dose Prescription – External Beam Radiation Therapy

For adjuvant treatment of microscopic disease, pelvic EBRT is typically delivered to a dose of 45–50.4 Gy in 1.8–2.0 Gy fractions.

In the presence of gross residual or unresectable disease, a conformal boost may be delivered to a total dose of approximately 60–70 Gy, respecting organ-at-risk tolerances.

For medically inoperable patients receiving definitive RT, EBRT doses of 45–50 Gy are commonly used, with or without a brachytherapy boost depending on tumor extent and response.

5. Vaginal Brachytherapy

Vaginal brachytherapy (VBT) is commonly used in the adjuvant setting to reduce the risk of vaginal cuff recurrence, particularly in patients with intermediate- or high-intermediate-risk features.

The target volume for VBT should include the vaginal cuff and typically no more than the upper two-thirds of the vagina. Dose may be prescribed to the vaginal surface or at a depth of 0.5 cm from the vaginal mucosa, depending on applicator geometry and institutional practice.

Common HDR VBT regimens include:
• 6 Gy × 5 fractions prescribed to the vaginal surface
• 7 Gy × 3 fractions or 5.5 Gy × 4 fractions prescribed at 0.5 cm depth

When used as a boost following EBRT, HDR VBT doses of 4–6 Gy in 2–3 fractions are commonly employed.

6. Special Clinical Scenarios

In selected patients with oligometastatic disease (generally 1–5 metastatic lesions), ablative RT or SBRT may be considered to achieve durable local control, particularly in the setting of controlled systemic disease.

For brain metastases, whole-brain radiation therapy (WBRT) with 30 Gy in 10 fractions remains a standard option. In patients with limited intracranial disease or favorable prognosis, stereotactic radiosurgery (SRS) or hippocampal-sparing WBRT should be considered.

7. Normal Tissue Dose Constraints

A. Radiation planning should adhere to normal tissue dose constraints as outlined in the NCCN Uterine Neoplasms guidelines 2026.2 (UN-A), with attention to bladder, rectum, bowel, bone marrow, kidneys, spinal cord, and femoral heads. When constraints cannot be met, adaptive planning or modification of treatment technique should be considered.
B. Normal organ dose responses from the QUANTEC project.

8. Palliative Radiation Therapy

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

Reference

1. NCCN Practice Guidelines in Oncology, 2026
2. ESGO–ESTRO–ESP guidelines for the management of patients with endometrial carcinoma: update 2025
3. Radiation Therapy for Endometrial Cancer (ASTRO) – 2022 (focused update in progress)
4. Perez and Brady's : Principles and Practice of Radiation Oncology, 7th ed, 2018
5. Eric K. Hansen, Handbook of Evidence-Based Radiation Oncology
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7. Nout RA, Smit VT, Putter H, et al. Vaginal brachytherapy versus pelvic external beam radiotherapy for patients with endometrial cancer of high-intermediate risk (PORTEC-2): an open-label, non-inferiority, randomised trial. *Lancet*. 2010;375(9717):816–823
8. de Boer SM, Powell ME, Mileshkin L, et al. Adjuvant chemoradiotherapy versus radiotherapy alone for women with high-risk endometrial cancer (PORTEC-3): final results of an international, open-label, multicentre, randomised, phase 3 trial. *Lancet Oncol*. 2018;19(3):295–309.