

Comparison of two adjuvant high-dose rate vaginal cuff brachytherapy dose fractionation regimens for treatment of early-stage uterine cancer

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Introduction

- Endometrial cancer is the most common gynecologic malignancy in the United States, with peak incidence at 63 years of age.¹
- PORTEC-2 trial established VBT alone as an effective modality for select high-intermediate risk patients.²
- There was no strict ABS guideline for dose fractionation; our institution adopted a 30Gy in 6 fractions regimen based on radiobiological calculations.^{3,4}
- COVID-19 pandemic led to a shift towards 22Gy in 4 fractions
- Objective: Compare oncologic outcomes and toxicity between the 30Gy/6fx and 22Gy/4fx regimens.
- Hypothesis: Both regimens are well-tolerated and equally effective.
- Impact: Findings will inform clinical practice and guide future treatment protocols for early-stage endometrial cancer.

Aims and Objectives

Aim 1. Compare clinical outcomes for 4 vs 6-fraction HDR brachytherapy treatment to the vaginal cuff.

Aim 2. Compare acute toxicity (<= 6 months) for 4 vs 6-fraction HDR brachytherapy treatment to the vaginal cuff.

Aim 3. Compare chronic toxicity (>6 months) for 4 vs 6-fraction HDR brachytherapy treatment to the vaginal cuff.

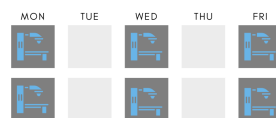
Methods

- This retrospective cohort study included 270 patients with FIGO stage I-II endometrial cancer treated with adjuvant HDR VBT at our institution between 1998 and 2022.

22 Gy 4 Fraction Calendar



30 Gy 6 Fraction Calendar



- Patients were followed at:
 - 3-month intervals for the first 2 years
 - 6-month intervals for the next 3 years
 - Annually after 5 years
- Toxicity Assessment:
 - Data collected prospectively from 2010 onward during radiation oncology visits
 - Toxicities categorized using Common Terminology Criteria for Adverse Events (CTCAE) v4.0
 - Acute toxicity: ≤ 6 months post-VBT
 - Chronic toxicity: > 6 months post-VBT

Statistical Methods

- Clinical outcomes analyzed:
 - Local recurrence (LR), Regional recurrence (RR), Distant metastasis (DM), Disease-free survival (DFS), Cause-specific survival (CSS) and overall survival (OS)
- Outcomes were analyzed using Kaplan-Meier estimates.
- Toxicity rates were compared between 4-fraction and 6-fraction regimens using the Chi-square test or Fisher's exact test.

Results

- A total of 270 patients with early-stage endometrial cancer (FIGO I-II) received adjuvant vaginal brachytherapy (VBT) using 30Gy in 6 fractions (n=195, 72.2%) or 22Gy in 4 fractions (n=75, 27.8%) from 1998–2022. The median follow-up time was 4.7 years (7.7 years for 6Fx vs. 1.3 years for 4Fx, p<0.001). Median age was 66 years (range: 31–89).
- Clinical Outcomes
 - At 2 years, there were no significant differences between treatment regimens in:

Figure 1 – Overall Survival (OS) in 4 Fractions Versus 6 Fractions

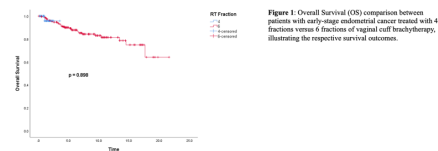
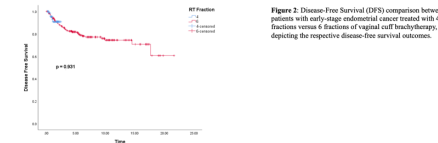


Figure 2 – Disease-Free Survival (DFS) in 4 Fractions Versus 6 Fractions



- Local recurrence, regional recurrence, and distant metastasis rates also showed no significant differences

Table 1 – Outcomes by Treatment Regimen	22Gy in 4 fractions	30Gy in 6 fractions	p-value
OS	95.8%	95.8%	0.898
CSS	95.8%	97.9%	0.353
Local Recurrence	2.4%	3.7%	0.536
Regional Recurrence	0%	4.2%	0.119
Distant Metastasis	6.8%	3.7%	0.267
Disease Free Survival	93.2%	89%	0.931

Table 3. Comparison of outcomes between two radiation therapy regimens (22Gy in 4 fractions and 30Gy in 6 fractions) including overall survival (OS), cause-specific survival (CSS), rates of local and regional recurrence, distant metastasis, and disease-free survival, with corresponding p-values indicating statistical significance p<0.05.

Toxicities

- Acute toxicity: No grade 3+ events; similar rates between groups (p=0.468).
- Chronic toxicity:
 - Lower rates in 4Fx for vaginal dryness (p=0.017) and stenosis (p<0.001).
 - Higher incidence of chronic toxicity in 6Fx (11.8% vs. 1.3%, p=0.004).

Conclusions

- Both 4-fraction and 6-fraction regimens demonstrated comparable survival outcomes. The 4-fraction regimen was associated with significantly lower chronic toxicity, particularly vaginal dryness and stenosis.
- Discrepancies in follow-up duration between the 4-fraction (1.33 years) and 6-fraction (7.74 years) groups restrict conclusive insights on long-term toxicity.
- Some toxicity data were collected retrospectively, potentially affecting assessment reliability.
- Future matched-pair analyses with longer follow-up are needed to validate findings and optimize fractionation strategies for adjuvant vaginal brachytherapy in endometrial cancer.⁵

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Acknowledgements

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