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Image-Guided High-Dose Rate Intracavitary Brachytherapy in the Treatment of Medically Inoperable Early Stage Endometrioid Type Adenocarcinoma

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INTRODUCTION

In patients with multiple medical comorbidities which preclude surgical therapy for early stage endometrioid type endometrial cancer, medical management providing surgical treatment at Temple University Hospital since 2010 received Exclusive Exclusion criteria in any evidence of nodal or surgical carcinoma, or histologic types other than endometrioid.

All treatment planning utilized CT imaging following placement of HDR applicators ( tandem with ring or tandem with ovoids). Prior to 2016, a high risk clinical target volume was defined by the radiation oncologist as approximately internal myometrial depth, in 2016, a protocol was initiated where gross tumour volume (GTV) was defined as the width of the endometrial stripe as demonstrated by MRI. Clinical target volume (CTV) was defined as the entire uterine corpus, cervix, and proximal 5 cm of vaginal wall, excluding fibroids.

Informed consent included patients with higher grade disease and histologic subtypes other than endometrioid, and many used applications other than tandem and ovoid. The dosimetry techniques used in this cohort demonstrate that higher radiobiology to CRT may provide similar efficacy to the ABS recommended minimum doses. The use of a single tandem in combination with CRT allows greater flexibility in dose distribution without requiring the use of multiple applicators or dose delivery under general anesthesia. For patients unable to undergo surgical management of early stage endometrial cancer due to medical contraindications, treatment with Intracavitary HDR brachytherapy is an excellent option for local disease control.

AIM

To report the experience with high dose rate, image guided interstitial brachytherapy in the treatment of medically inoperable, early stage endometrial cancer.

METHODS

All American Joint Committee on Cancer (AJCC) stage T1a or T1b endometrioid type endometrial cancer, with medical comorbidities precluding surgical treatment at Temple University Hospital since 2010 received Exclusive Exclusion criteria in any evidence of nodal or surgical carcinoma, or histologic types other than endometrioid.

All treatment planning utilized CT imaging following placement of HDR applicators ( tandem with ring or tandem with ovoids). Prior to 2016, a high risk clinical target volume was defined by the radiation oncologist as approximately internal myometrial depth, in 2016, a protocol was initiated where gross tumour volume (GTV) was defined as the width of the endometrial stripe as demonstrated by MRI. Clinical target volume (CTV) was defined as the entire uterine corpus, cervix, and proximal 5 cm of vaginal wall, excluding fibroids.

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RESULTS

Eight patients received external beam radiation therapy (EBRT) followed by Intracavitary HDR brachytherapy. Seven patients underwent intracavitary HDR brachytherapy alone, in a mean cumulative dose to 90% (D\(90\)) of GTV was 90.6 Gy (75.6-117.1) in equivalent dose 2 Gy fractions (EDQ2, 5.5±1.2). Mean average D\(90\) EDQ2 to CTV was 51.6 Gy (15.7-24). Average follow up was 29 months. Four patients died from concurrent disease at an average of 2.8 years after completion of treatment. Except for one (8.6%) patient who occurred at 9 months after CRT, all patients remained disease-free for the remainder of follow-up.

CONCLUSIONS

Comorbid conditions are common in patients with low-grade, endometrioid type endometrial cancer, and a combination of medical comorbidity, diabetes, severe COPD, history of obesity, prior GU with or without pulmonary emison, and cardiac disease, which increase surgical risks, are also likely causative of premature death. In the event of inoperability due to the severity of these comorbid conditions, an unexpected late recurrence of endometrial cancer previously treated with radiotherapy is unlikely to be a significant driver of premature mortality when compared to the patient’s other medical problems.

The Society recommends that the D90 for GTV should be at least 80 Gy, and that the D90 for CTV be at least 48 Gy with intracavitary brachytherapy alone and at least 65 Gy when combined with EBRT. Our data demonstrate that a dose lower than recommended (many of our patients were treated prior to these recommendations) treatment still has a high level of success. Our findings are consistent with other case series in the literature, though those studies included patients with higher grade disease and histologic subtypes other than endometrioid, and many used applications other than tandem and ovoid. The dosimetry techniques used in this cohort demonstrate that higher radiobiology to CRT may provide similar efficacy to the ABS recommended minimum doses. The use of a single tandem in combination with EBRT allows greater flexibility in dose distribution without requiring the use of multiple applicators or dose delivery under general anesthesia. For patients unable to undergo surgical management of early stage endometrial cancer due to medical contraindications, treatment with Intracavitary HDR brachytherapy is an excellent option for local disease control.

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REFERENCES


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