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

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INTRODUCTION
In patients with multiple medical comorbidities which preclude surgical therapy for early stage endometrioid types, a combination of medical therapy, talc, or hormonal therapy, prior history of IVF or with arterial or venous embolism, and cardiac disease, which increase surgical risk, are also likely causes of premature death. In the event of incomplete resection of the tumor, the risk of recurrence is significant, which makes effective postoperative radiation important. The advent of iridium 192–192–iridium 192–brachytherapy in the treatment of medically inoperable, early stage endometrial cancer is considered to be the only curative option. Dosimetry has become much more precise, allowing higher doses to be used for large, less critical regions of the body, leading to dose escalation. The use of tandem and ovoids and a central catheter has become standard for patients with a high body mass index (BMI), and an experienced interventional radiologist is required for the procedure. HDR brachytherapy is an excellent option for local disease control.

 METHODS
All American Joint Committee on Cancer (AJCC) stage 1A to 1B endometrial type endometrial cancer, with medical comorbidities precluding surgical management treated at Temple University Hospital since 2012 were reviewed. Inclusion criteria included no evidence of nodal or surgical cervical disease, and histologic types other than endometrioid. All patients were treated with a combined modality approach of brachytherapy and EBRT. HDR ICBT included patients with higher grade disease and histologic subtypes other than endometrioid, and many used applications other than tandem and ovoids. The dosimetry techniques used in this cohort demonstrate that lower radiation doses to the CTV may provide similar efficacy to the ABS recommended minimum doses. The use of a single tandem in combination with EBRT may provide improved flexibility in dose distribution without requiring the use of multiple applicators or a combination of EBRT delivery under general anesthesia. For patients unable to undergo surgical management of early stage endometrial and cervical endometrial cancer due to medical contraindications, treatment with interstitial HDR brachytherapy is an excellent option for local disease control.

 RESULTS
Eight patients received external beam radiation therapy (EBRT) followed by inter-vaginal HDR brachytherapy. Seven patients underwent interventional HDR brachytherapy alone. All patients, mean cumulative dose to 90% (D90) of GTV was 90.8 Gy (59.5–171.1 Gy) in equivalent 2 Gy fractions (EDQ2, 81–106). Mean cumulative D90 GTV to CTV was 51.6 Gy (18.7–74). Average follow-up was 29.9 months. Four patients died from recurrent disease (as an average of 2.83 years after completion of treatment). Except for one (6.6%) patient who remained disease free for the remainder of the follow-up, all patients died from disease within the treated field. The median survival was 36 months (0–101 months).

 CONCLUSIONS
Comorbid conditions are common in patients with low-grade, endometrial type endometrial cancer, and a combination of multiple medical illness, talc, or hormonal therapy, prior history of IVF or with arterial or venous embolism, and cardiac disease, which increase surgical risk, are also likely causes of premature death. In the event of incomplete resection of the tumor, the risk of recurrence is significant, which makes effective postoperative radiation important. The advent of iridium 192–brachytherapy in the treatment of medically inoperable, early stage endometrial cancer is considered to be the only curative option. Dosimetry has become much more precise, allowing higher doses to be used for large, less critical regions of the body, leading to dose escalation. The use of tandem and ovoids and a central catheter has become standard for patients with a high body mass index (BMI), and an experienced interventional radiologist is required for the procedure. HDR brachytherapy is an excellent option for local disease control.

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3. Scott E, Jordan MD, Ida McIlivy MD, Enrique Hernandez MD, J. Stuart Ferriss MD, Curtis T. Miyamoto MD FACR, Shidong Li PhD, and Bhinder Malhotra MD. Image-Guided High-Dose Rate Intrauterine Brachytherapy in the Treatment of Medically Inoperable Early Stage Endometrioid Type Endometriocarcinoma. Scott E. Jordan MD, Ida McIlivy MD, Enrique Hernandez MD, J. Stuart Ferriss MD, Curtis T. Miyamoto MD FACR, Shidong Li PhD, and Bhinder Malhotra MD. Image-Guided High-Dose Rate Intrauterine Brachytherapy in the Treatment of Medically Inoperable Early Stage Endometrioid Type Endometriocarcinoma. Scott E. Jordan MD, Ida McIlivy MD, Enrique Hernandez MD, J. Stuart Ferriss MD, Curtis T. Miyamoto MD FACR, Shidong Li PhD, and Bhinder Malhotra MD. Image-Guided High-Dose Rate Intrauterine Brachytherapy in the Treatment of Medically Inoperable Early Stage Endometrioid Type Endometriocarcinoma. Scott E. Jordan MD, Ida McIlivy MD, Enrique Hernandez MD, J. Stuart Ferriss MD, Curtis T. Miyamoto MD FACR, Shidong Li PhD, and Bhinder Malhotra MD. Image-Guided High-Dose Rate Intrauterine Brachytherapy in the Treatment of Medically Inoperable Early Stage Endometrioid Type Endometriocarcinoma.