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TITLE

High Rate of Late Toxicity in Patients Treated with MRI-Guided HDR Brachytherapy for Locally Advanced Cervix Cancer: The Importance of Smoking Cessation

HYPOTHESIS:

We hypothesize that image-guided HDR brachytherapy for treatment of cervix cancer will improve local control and severe late toxicities.

BACKGROUND/AIMS:

Magnetic resonance imaging (MRI)-guided high-dose-rate (HDR) brachytherapy for locally advanced cervical cancer is used to improve target coverage and limit dose to critical structures. Here we evaluate disease control and toxicity rates utilizing this technique.

METHODS:

This is a retrospective review of patients with FIGO stage I-IV cervical cancer who underwent MRI -guided HDR tandem and ring (T&R) brachytherapy between January 2010 and January 2015 at a single institution. All patients received pelvic external beam radiotherapy (EBRT) to a median dose of 45 Gy followed by T&R HDR brachytherapy. All patients received an MRI with at least the first brachytherapy insertion (CT was performed for non-MRI insertions) and completed at least 4 fractions of brachytherapy. Gross tumor volume, high-risk clinical target volume (HR-CTV), and organs at risk were all contoured according to GEC-ESTRO guidelines.

RESULTS & CONCLUSIONS

Forty-three patients underwent 214 HDR T&R brachytherapy insertions between 2010 and 2015. The mean age was 50 years (range: 29-74). Sixty-three percent of patients were smokers. Histopathology was predominantly squamous cell carcinoma (79%). Average tumor size was 5.5cm, and 56% were FIGO stage IIB. Fifty-one percent had positive lymph nodes at diagnosis. Median total (EBRT + brachytherapy) equivalent dose in 2Gy fractions (EQD2) to 90% of the HR-CTV was 79.97Gy, and median total EQD2 dose to Point A was 77.04Gy. Median follow up was 48 months. At 5 years, the local control rate was 98%, the regional control rate was 84%, the freedom from distant metastases rate was 90%, the disease-free survival rate was 73%, the cause-specific survival rate was 78%, and the overall survival rate was 57%. Late grade 3 and higher toxicities were experienced in 14% of patients, and 28% experienced a late grade 2 or higher toxicity. We evaluated the risk of developing a late grade 2 or higher bladder, vaginal, sigmoid or rectal complication based on the total dose to 2cc of each of these structures being greater than or less than the median dose to these structures and found no correlation. The 5 year rate of developing a grade 2 or higher late toxicity was 11% for non-smokers, compared with 60% for smokers (p=0.0035).

With a median follow up of 4 years, this study demonstrates excellent local control. However, late toxicity continues to be clinically significant, even with MRI guidance and volume based dosimetry, and smoking is a significant predictive factor for late toxicity. This data supports using aggressive smoking cessation strategies in patients receiving radiotherapy for cervix cancer.