High-Dose-Rate Brachytherapy for Cervical Cancer: The Effect of Total Reference Air Kerma on the Results of Single-Channel and Tri-Channel Applicators

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Abstract : Introduction: Single channel and tri-channel applicators are used in the traditional treatment of cervical cancer. Total reference air kerma (TRAK) and treatment outcomes in high-dose-rate brachytherapy for cervical cancer using singlechannel and tri-channel applicators were the main objectives of this retrospective study. Material and Methods: Patients in the radiotherapy division who received brachytherapy, chemotherapy, and external radiotherapy (EBRT) using single and trichannel applicators were the subjects of a retrospective cohort study from 2016 to 2020. All brachytherapy parameters, including TRAK, were calculated in accordance with the international protocol. The Kaplan Meier method was used to analyze survival rates using a log-rank test. Results and Discussions: Based on treatment times of 15.34 (10-20) days and 21.35 (6.5-28) days, the TRAK for the tri-channel applicator was 0.52 cGy.m² and for the single-channel applicator was 0.34 cGy.m². Based on TRAK, the rectum, bladder, and tumor had respective Pearson correlations of 0.082, 0.009, and 0.032. The 1-specificity and sensitivity were 0.70 and 0.30, respectively. At that time, AUC was 0.71. The log-rank test showed that tri-channel applicators had a survival rate of 95% and single-channel applicators had a survival rate of 85% (p=0.565). Conclusions: The relationship between TRAK and treatment duration and Pearson correlation for the tumor, rectum, and bladder suggests that TRAK should be taken into account for the proper operation of single channel and tri-channel applicators.

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Keywords : single-channel, tri-channel, high dose rate brachytherapy, cervical cancer

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