ABSTRACT

Radiotherapy plays a crucial role in the treatment of cervical cancer. The combination of external beam radiotherapy (EBRT) and brachytherapy has proven to be an effective treatment modality. However, proper radiation treatment planning is essential to ensure optimal therapeutic outcomes. This study aims to evaluate brachytherapy treatment planning using variations of the Point A reference position.

The prescribed radiation dose consisted of 25 fractions × 2 Gy delivered through external beam radiotherapy and 5 fractions × 6 Gy delivered through brachytherapy. The study was conducted on patients undergoing two-dimensional (2D) intracavitary brachytherapy using five different Point A reference variations: 16 mm, 18 mm, the standard Manchester Point A of 20 mm, 22 mm, and 24 mm. The brachytherapy planning process included the acquisition of posteroanterior (PA) and lateral radiographic images, treatment planning using a Treatment Planning System (TPS) with varying Point A references, and evaluation of dose distributions at each Point A as well as doses received by organs at risk (OARs), specifically the bladder and rectum.

The results showed that the highest dose values were obtained with the 24 mm Point A variation, where the maximum radiation doses received by the rectum and bladder were 68 Gy and 74 Gy, respectively. When compared with the dose constraints recommended by the International Commission on Radiation Units and Measurements (ICRU) Report 89, in which Point A should receive 100% of the prescribed dose while the bladder and rectum should receive doses below 80 Gy and 75 Gy, respectively, the obtained dose distributions remained within acceptable limits.

These findings indicate that variations in Point A reference positions may be considered in 2D intracavitary brachytherapy planning for cervical cancer, particularly in cases involving larger tumor sizes and specific patient anatomical conditions. This approach may provide greater flexibility compared with the conventional practice of using only the standard Manchester Point A reference at 20 mm for dose normalization.

Keywords: *Radiotherapy, Cervical Cancer, Brachytherapy, Point A Variation, Organs at Risk (OARs*