

AbstractID: 2745 Title: Treatment planning in HDR intracavitary brachytherapy: Comparison of critical organ doses as estimated by orthogonal radiographs based planning and image based planning

Purpose:

Doses to rectum, bladder and Point-A in patients who received intracavitary HDR brachytherapy treatment were calculated by both orthogonal radiographs reconstruction method and by image based reconstruction method and were compared.

Method and Materials:

Twenty-five patients of carcinoma cervix who received intracavitary brachytherapy treatment by micro-Selectron HDR unit were included in this study. For these patients, in Plato treatment planning system, reconstruction of sources, applicator, organs at risk and Point-A were done using conventional orthogonal radiographs and by using 1 mm thick CT scan images. Bladder was identified on radiographs through a Foley's catheter inserted into it filled with 7 cc of radio-opaque fluid and the rectum through a rectal marker. Doses were calculated at 5 points each on bladder and rectum, for the treatment dose of 7 Gy to Point-A (right & left). On CT images, these organs were delineated with the radiologists help and from dose-volume-histograms, doses to 1, 2 and 5 cc of these organs were calculated besides dose to Point-A (right & left).

Results:

The critical organ doses estimated by the CT method were consistently higher when compared to those by the radiographs method. When compared to the radiographic dose maximum for bladder, doses to 1, 2 and 5 cc of bladder were higher by 89%, 69.7% and 41.6% on an average respectively. For rectum, the corresponding values were 36.6%, 21.7% and 0.4%. However dose to Point-A did not differ by more than 3% between the two methods.

Conclusion:

The conventional orthogonal radiography based reconstruction method consistently underestimates the doses to critical organs while the doses to reference points are comparable in these two methods. Long-term follow-up in such patients can identify the threshold volumes for these critical organs beyond which complication rates are bound to rise.