

AbstractID: 13150 Title: Optimization of the applicator position in the treatment of vaginal vault HDR brachytherapy: A study based on GEC-ESTRO guidelines

Purpose:

Rectum and bladder are the most common critical structures in the prophylactic treatment of vaginal vault following surgery of early stage endometrial cancers using high-dose-rate (HDR) brachytherapy. Brachytherapy treatment usually involves employing a single catheter in a vaginal cylinder applicator with dose prescription at 5mm from a variable diameter colpostats leaving very little patient specific customization/optimization options. CT based brachytherapy treatment planning has opened yet another avenue of optimization based on patient's anatomy. Present study focuses to see if changing the applicator angle reduces the doses to the critical structures.

Methods & Materials:

In this retrospective study, we have used 6 patients with the applicator in natural position as well as in a position parallel to the treatment couch using a simple spirit level. CT scans were obtained in both the positions. Rectum and bladder were segmented in each set by the same physician. An optimized treatment plan, designed to deliver 700cGy at 5mm from the colpostats surface, was generated employing 5cm length along the vagina in both the CT datasets. The treatment plans were evaluated based on GEC-ESTRO guidelines of 0.1, 1 & 2 cc of rectum and bladder.

Results:

The mean angle of vagina was found to be 10.3° [min= 4.4° , max= 22.2°] in relation to the treatment couch. Placing the applicator in a position parallel to couch resulted in mean dose reduction of 6, 8.1 & 9.5% for 0.1, 1 & 2 cc of rectum, respectively. However, it resulted in an increase in the respective bladder doses by 15.3, 13.2 & 13.3%.

Conclusion:

Since the bladder has significantly higher radiation tolerance than the rectum, use of vaginal applicator in a position parallel to the couch reduces rectal dose and potential rectal morbidity. This procedure can be easily adapted in any clinic with minimum additional efforts or hardware cost.