

Applicator based HDR brachytherapy for carcinoma of the cervix and the endometrium in general requires customized planning. As HDR remote afterloading gains its popularity in brachytherapy, it becomes increasingly important that appropriate planning procedure be followed to achieve desired treatment goals. TG-56 recommends that optimization be performed for cervix applications. However, strategies employed in treatment planning vary widely among institutions. Optimization is not generally done in routine clinical practices in many institutions because of difficulties in implementing the desired isodose on reference points.

The purpose of this study intends to derive a systematic approach to treatment planning so as to maintain consistency between the isodose distribution and the applicator characteristics associated with the patient anatomy. Three groups of HDR treatment planning data with Henschke applicators are compared and analyzed. The first group followed Manchester system and employed no optimization. The second group followed Madison/Wisconsin system with optimization on reference points of variable dose values. The third group used a distance-controlled optimization to the treatment planning for the patients in the above two groups for either Manchester or Madison systems. Here, we propose to adopt a set of reference points with controlled distances with respect to the applicator so that the desired 100% isodose line would pattern. The results show that the distance-controlled optimization achieves the desired dose distribution. It brings a systematic approach to the treatment planning. The procedure is clinically feasible and can be easily adapted to (but not limited to) the Nucletron BPS planning system.