

Purpose: This paper focuses on HDR gynecological treatments using Fletcher or ring applicators. Our present standard is to use orthogonal images to reconstruct the 3D position of the applicator. The organs at risk are defined using the ICRU points. Our purpose is to introduce 3D planning using a novel cone beam CT (CBCT) scanner.

Materials&Methods: The CBCT scanner Simulix Evolution (Nucletron), dedicated for brachytherapy was used. This new tool allows us to obtain 3D images in the treatment room prior to treatment. These 3D images are used to recalculate the actual dose delivered during the treatment using the Plato Brachytherapy Planning System (Nucletron). The first step was to optimize the image quality by modifying the acquisition protocol and some of the default parameters of the image acquisition. We can then compare the dose calculated with the orthogonal images and with the CBCT images.

Results: The currently achieved image quality allows us to easily find and reconstruct the applicators and plan the cases. We can also in most cases draw organs at risk like the bladder or even the rectum using the rectal probe as a guide. This allowed us to identify cases where the real position of the rectum was moved by up to 2cm compared to the ICRU point. These cases would have required an asymmetric loading of the colpostats in order to reduce the dose to the rectum. It is however still impossible, as in the case of CT images, to use the CBCT images to draw the target without considering the introduction of other modalities such as MRI or Ultrasound.

Conclusion: The planning for GYN from the CBCT images is feasible. It will allow us to better assess the dose to the organs at risk using dose-volume histograms and compare them to the ICRU points commonly used.