

We define simulation for HDR brachytherapy, HDRB, as the process through which the optimum dwell positions - times pattern for each patient is devised. It starts usually with defining and localizing the target volume and organs at risk and ends with the acceptance of an isodose distribution presented in volume or several significant planes and overlapped on the patient's anatomy. This is routinely accomplished using radiographic films taken at a conventional simulator unit. Due to the impossibility to visualize the target and organs at risk directly on films, in most cases the simulation is based both on the simulator images and CT scans. An alternative approach is to replace the simulator altogether with a CT based simulation, CTS. Despite the fact that the CTS has been introduced in teleradiotherapy ten years ago and has proven to be a very useful tool, there are no reports on its use for brachytherapy. The rationale of a CTS includes: decreases simulation time, patient's discomfort and the risk of applicator movement by eliminating the patient's manipulation at the simulator, can be used as a back -up for conventional simulation and it is more cost effective. The purpose of this paper is to investigate the practicability and usefulness of CTS for HDRB in daily clinical practice and to present our CTS procedures and results for interstitial (prostate), intracavitary (gynecological), intraluminal (lung) and mold (melanoma) procedures. Some limitations of CTS and possible solutions are discussed. Treatment plans based on CTS and conventional simulation are compared.