

Methods To Increase The Effectiveness Of Prostate HDR Brachytherapy

In our HDRB protocol for prostate cancer the needles are inserted under ultrasound guidance while the treatment planning is based on CT images. Since often the position of needles had to be “adjusted” before the first fraction, we started to pre-plan the treatments. There are no previous reports in the literature on preplans for HDRB. The preplans are based on CT scouts and delineation of the prostate volume on each slice and give the physician the optimum needle number and placement within the template as well as the depths of insertion. The volume of the prostate and the position and shape of the urethra is also estimated from this pre-implant CT study. The simulation procedure (CT based, methods to define and localize the target volume and organs at risk), 3D treatment planning aspects (optimization methods for both target coverage and for minimizing doses at organs at risk, isodose distributions, dose-volume histograms, treatment plan selection) and treatment delivery approaches are presented along with practical examples. Radiation doses to the prostatic urethra and anterior rectal wall have been evaluated on 35 prostate implants and correlated with the target coverage. We found that the prostate can be adequately covered by the 600 cGy isodose line while doses to the urethra and anterior rectal wall can be kept below 650 - 680 and 450 cGy/fraction, respectively.