

AbstractID: 4736 Title: Permanent prostate implants: Dose to critical structures inferior to the prostate

The basic goal of any radiation therapy is to maximize the dose to the tumor while minimizing dose to normal structure. With permanent prostate implants, treatment plans are developed to spare the urethra and the rectum. Post-implant evaluation shows that the actual implant does not mimic the plan primarily due to prostate swelling and source position shift either at the time of deposition or post implant. Dose indices have been developed to evaluate dose coverage to the implant. 90% prescription to the 100% of the prostate (V100) is considered an excellent implant. A good execution of the implant plan will still maintain a cooler urethra and low dose to the rectum. It is common to see under-dose in the base region of the prostate and seeds below the apex of the prostate. Sources below the apex of the prostate result in dose to the external sphincter, corpus cavernosum and internal pudendal artery. At our institution, we routinely obtain an MR for anatomic delineation and a CT for source localization 2 weeks after the implant. The datasets are registered based on mutual information techniques and dose to the normal tissue are reported. Fifteen patient entered in this study received a permanent implant to 145 Gy using I125 sources. The average volume of the MR prostate was 50.7cc. The average V100 was 90.5%. The average max dose to the right and left corpus cavernosum was 26.1(10.6) Gy and 28.1(12.4) Gy, respectively. The average max dose to the right and left pudendal arteries was 39.7(25.2) and 40.9(18.5) Gy, respectively. The average dose to 90% of the external sphincter was 132.1(44.9) Gy. With sufficient follow-up it is possible to correlate the dose to the vascular structures and their effect on erectile function, and dose to the external sphincter and the effect on urinary function.