

Three-dimensional computed tomography-guided brachytherapy of prostate cancer in patients without rectum

Short Title: 3D CT-guided brachytherapy of prostate cancer

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Key words: colorectal cancer, prostate cancer, brachytherapy



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Background

Approximately 50,000 men will survive colorectal cancer in the US after treatment with colectomy, radiation therapy, and chemotherapy, and 10% (5,000) of these patients may develop a second primary with prostate cancer. Because of previous radiation therapy and radical surgery, these patients are not candidates for a second external-beam radiation therapy (EBRT) or radical prostatectomy, and have no rectum for transrectal ultrasound-guided biopsy or transperineal brachytherapy. For the first time, we report the only method of treatment for these patients using three-dimensional stereotactic system with computed tomography-guided brachytherapy with iodine 125 seeds. The low dose rate and high absorption (attenuation) of iodine 125 seeds allows a second radiotherapy treatment with interstitial implant. We recommend hormone therapy for treatment of prostate cancer in patients who have medical conditions contraindicating spinal or epidural anesthesia.

Methods

From June 1994 to November 2003, in the concord of 800 patients treated with three-dimensional stereotactic system with computed tomography-guided permanent implant, 5 patients did not have a rectum. Four of these patients had colectomy for colorectal cancer and 1 for ulcerative colitis. One patient had extensive invasion of the seminal vesicles of prostate cancer. Two of these patients had unsuccessful attempts for radical prostatectomy, and 2 patients had unsuccessful CT biopsies. Our posterior approach does not require transrectal ultrasound-guidance. The three-dimensional stereotactic system is adjusted to avoid obstruction of the

needle by the coccyx. Precise placement of seeds with use of the stereotactic system is accomplished to cover the target which includes the entire prostate, 5 mm outside the capsule of the prostate, the surrounding fat tissue, and seminal vesicles if involved. Pre- and post-implant dosimetry were performed with Varian software. Radiation dose of 144 Gy was accomplished with the use of iodine 125 seeds in strand.

Results

All patients except one with seminal vesicle invasion had excellent clinical and biochemical control in 1 – 4 years post-implant. There was no gastrointestinal or urinary morbidity except the patient with seminal vesicle involvement developed stricture of the distal ureter requiring stent.

Conclusion

Brachytherapy of prostate cancer in patients without rectum using three-dimensional stereotactic system and computed tomography-guidance is the only currently available and effect method of diagnosis and treatment.