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Focal Therapy

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Merel Nissenberg: Focal Therapy Of Prostate

Traditionally, prostate cancer has been treated with either radical prostatectomy or whole-gland radiation. However, with the growing sophistication of MRI's and other imaging modalities, we are now able to identify cancer that exists in only a small portion of the prostate. There are now different types of technologies that have been developed to treat just the tumor itself; these are called focal therapies. The best scenario for focal treatment of prostate cancer is one in which the prostate cancer has an identifiable, single focus within (and not involving) the entire gland, and when the tumor can be accurately localized. As long as the cancer can be identified and treated without treating the entire prostate, and when the patient can be monitored for a long time, focal therapy can be an ideal modality for dealing with the disease. The rationale is to destroy the cancer while leaving healthy prostate cancer tissue surrounding the tumor.

Focal treatment is best for intermediate-risk prostate cancer (Gleason 7) that is found in only a single area of the prostate. This equates to about 30% of newly diagnosed prostate cancer cases. There are several different types of focal therapies currently being utilized: Cryotherapy; HIFU (high-intensity focused ultrasound); Focal Laser Ablation; Photodynamic Therapy; and Irreversible Electroporation. However, it should be noted that these are relatively new therapies, meaning that long-term data with oncologic results is still needed. Some of the different modalities are described below.

Cryotherapy
Cryotherapy was the first type of focal therapy employed in prostate cancer, beginning in the mid-1990s. It involves placing cryoprobes into the prostate with the patient under general anesthesia and then creating an iceball that surrounds the tumor. Cells within the prostate either die immediately from the cold temperature or later from an inflammatory response. However, it is difficult to monitor the ice ball in real time, and measurement and control are difficult.

HIFU
HIFU was first used in prostate cancer in 1995 and is FDA-approved just like cryotherapy to treat prostate tissue. Targeted prostate cancer cells absorb ultrasonic waves and convert them to heat which kills or damages the cells. Unfortunately, prostate imaging in real time remains an issue. While HIFU was first used to treat the entire prostate gland, it is now used as a form of focal therapy. Cancer-free rates upon re-biopsy have been very encouraging.

Focal Laser Ablation
Focal Laser Ablation involves placing a needle-like probe into the tumor with imaging as a guide. The laser heats the tissue to a high enough temperature to cause cell death. In two recent small clinical trials at UCLA, out of 10 patients only 3 had no residual cancer at biopsy; however, a third clinical trial is in the works there that utilizes a focal laser ablation device better suited to measure tissue destruction. While general anesthesia used to be required, patients now can have focal laser ablation with only local anesthesia.

Photodynamic therapy
Photodynamic therapy is another form of focal therapy, involving photosensitizers given intravenously that are activated by light. Free radicals thereby created go on to damage local blood vessels and tissue. This is an exciting method of tissue destruction but there is little data so far to demonstrate its

efficacy in prostate cancer. However, in a small study of 85 patients, 74% were cancer-free on biopsy 6 months later.

Electroporation (irreversible)
Electroporation (irreversible) uses electric currents between multiple small probes within the prostate in order to destroy prostate tissue by creating holes in the cell walls, which causes cell death. There are no large changes in temperature of the treated tissue, unlike the other methods of focal therapies.

At the March 2019 European Association of Urology meeting, Dr. Laurence Klotz from Toronto presented early findings from the 115 patients enrolled in the TACT Study, looking at MRI-guided Transurethral Ultrasound Ablation (TULSA) for patients with localized prostate cancer. TULSA is a minimally-invasive and MRI-controlled technology. 95% of the enrolled patents met the primary efficacy criteria of equal to or greater than a 75% reduction in PSA. Median drop in PSA was 95% from baseline. More studies have begun with this modality.

In conclusion, in low-volume, intermediate prostate cancer, focal therapies remain a potential type of treatment in appropriate patients. However, much more data is needed, as well as long-term follow-up, in order to be confident about the results. Pp[1]

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