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Letter to Editor

HIFU and its Role in Urology

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High-Intensity Focused Ultrasound (HIFU) applies high-intensity focused ultrasound energy to locally heat and destroys diseased or damaged tissue through ablation. HIFU is a non-invasive approach that uses precisely delivered ultrasound energy to achieve tumor cell necrosis without radiation or surgical excision. In current urological oncology, HIFU is used clinically in the treatment of Prostate Cancer (PC). Clinical research on HIFU therapy for localized PC began in the 1990s, and most PC patients were treated with the Ablatherm device. HIFU treatment for localized PC can be considered as an alternative minimally invasive therapeutic modality for patients who are not candidates for radical prostatectomy. Patients with lower pre-HIFU PSA levels and favorable pathologic Gleason score seem to present better oncologic outcomes [1]. No prospective data exist evaluating Focal Therapy (FT) and Androgen Deprivation Therapy (ADT) combination in terms of cancer control for the treatment of localized PCa [2-5]. As it is well understood high-intensity focused ultrasound is a novel and noninvasive treatment for an increasing number of cancers and benign diseases. The principle is like focusing the sun's rays with a magnifying glass, causing a burn at the focal point!!! This can be done with ultrasound if the usual diagnostic energy is increased 10,000 times!!!. The ultrasound energy is generated under water and the energy is passed noninvasively into the body to a sharp focus where it destroys tissue. The technology is rapidly evolving. In urology, trials have been done in a number of areas but the two that are most promising at present are for the treatment of renal and prostate cancers. Treatment of renal cancer is currently limited by the position of the kidneys due to the ribs and the presence of perinephric fat, but treatment for prostate cancer is becoming more established [6].

Traditional cancer treatments have been associated with considerable morbidity for patients. Focused ultrasound offers a novel modality for the treatment of various forms of cancer which may offer effective oncological control and low morbidity. Studies assessing the current applications of focused ultrasound in the treatment of genitourinary cancers, including prostate, kidney, bladder, penile, and testicular cancer were studied. Current research indicates that High-Intensity Focused Ultrasound (HIFU) focal therapy offers effective short-term oncologic control of localized prostate and kidney cancer with lower associated morbidity than radical surgery. In addition, studies in mice have demonstrated that focused ultrasound treatment increases the accuracy of chemotherapeutic drug delivery, the efficacy of drug uptake, and cytotoxic effects within targeted cancer cells. Ultrasound-based therapy shows promise for the treatment of genitourinary cancers. Further research should continue to investigate focused ultrasound as an alternative cancer treatment option or as a complement to increase the efficacy of conventional treatments such as chemotherapy and radiotherapy [7]. The procedure is not without complications. Urethral narrowing post-HIFU appears to overwhelmingly involve the prostatic urethra. Patients usually have a significant treatment burden over a prolonged period and are often managed with repeated endoscopic treatment, difficult prostatic surgery, or urinary diversion as they have obstruction that is not amendable to urethral reconstruction. Most patients with HIFU strictures experience a diminished QOL due to persistent urinary symptoms [8].

Redo high-intensity focused ultrasound is associated with an increase in urinary side effects but sexual side effects do not appear to be significantly increased. The number of adverse events seems to be equivalent after the first and redo treatments. Meticulous patient selection is of top importance when selecting men for redo high-intensity focused ultrasound [9]. HIFU may be indicated as a primary treatment for low- or intermediate-risk prostate cancer and salvage therapy for local recurrence as a promising way to address the limitations of current standard therapies [10].

References

1. Mohammed Ikhorayef, Mustafa Z. Mahmoud, Khalid S. Alzimami, Abdelmoneim Sulieman, et al. (2015) High-Intensity Focused Ultrasound (HIFU) in Localized Prostate Cancer Treatment. Pol J Radiol 80: 131-141.
2. Arnas Bakavicius, Giancarlo Marra, Petr Macek, Cary Robertson, et al. (2022) Available evidence on HIFU for focal treatment of prostate cancer: a systematic review 48: 263-274.
3. Gregor Duwe, Katharina Boehm, Maximilian Haack, Peter Sparwasser (2023) Single-center, prospective phase 2 trial of high-intensity focused ultrasound (HIFU) in patients with unilateral localized prostate cancer: good functional results but oncologically not as safe as expected. World Journal of Urology 41: 1293-1299.

4. Arjun Sivaraman, Giancarlo Marra, Armando Stabile, Annick Mombet, et al. (2020) Does mpMRI guidance improve HIFU partial gland ablation compared to conventional ultrasound guidance? Early functional outcomes and complications from a single center 46: 984-992.

5. Giancarlo MARRA, Paolo DELL'OGLIO, Mohammed BAGHDADI, Xavier CATHELINEAU (2019) Multimodal treatment in focal therapy for localized prostate cancer using concomitant short-term androgen deprivation therapy: the ENHANCE prospective pilot study. Minerva Urologica e Nefrologica 71: 544-548.

6. David Cranston, Tom Leslie, Gail ter Haar (2021) A Review of High-Intensity Focused Ultrasound in Urology, Cancers 2021.

7. John Panzone, Timothy Byler, Gennady Bratslavsky, Hanan Goldberg (2022) Applications of Focused Ultrasound in the Treatment of Genitourinary Cancers. Cancers 14: 1536.

8. David W. Barham, John Barnard, Joel Gelman (2022) Urethral Stricture/ Stenosis as a Complication of High-Intensity Focused Ultrasound of the Prostate (HIFU): What is the Overall Patient Experience? 2022.

9. Viktor Berge, Louise Dickinson, Neil McCartan, Richard G. Hindley (2014) Morbidity Associated with Primary High Intensity Focused Ultrasound and Redo High Intensity Focused Ultrasound for Localized Prostate Cancer 191: 1764-1769.

10. Minh-Tung Do, Tam Hoai Ly, Min Joo Choi, Sung Yong Cho (2022) Clinical application of the therapeutic ultrasound in urologic disease: Part II of therapeutic ultrasound in urology. Investig Clin Urol 63: 394-406.