PROSTATE CANCER PROSTATIC SWELLING AND SHIFT UPON HIFU

New data show that high-intensity focused ultrasonography (HIFU) causes significant prostate swelling and shift, potentially leading to untreated gaps between adjacent HIFU foci and inadequate tumour treatment.

In a retrospective study of 44 patients receiving whole-gland HIFU (over three sessions) as primary therapy for prostate cancer, Shoji *et al.* reported median volume increases of 18% in the transition zone, 9% in the peripheral zone, and 13% in the entire prostate. Median intraprostatic shift was 3.7 mm and 5.5 mm in the transition and peripheral zones, respectively.

“As HIFU targets sections of tissue that are millimeters in diameter, even small prostatic shifts caused by swelling can result in untreated gaps between two adjacent therapeutic foci,” says Osamu Ukimura, who led the study.

The greatest effect was observed in the initial 25 min of the first HIFU session; little swelling was evident thereafter. Importantly, smaller prostates and prostates with a lower presumed circle area ratio (PCAR)—a validated morphologic ultrasonography-based parameter that represents intraprostatic pressure—were associated with greater prostate swelling and shift.

Intraprostatic pressure increased with prostate volume in the first 25 min. However, once PCAR approached 1.0 (suggesting that the prostate shape is circular), the intraprostatic swelling stopped because the prostatic capsule could expand no further. “Our study demonstrated that patients with a smaller PCAR or prostate volume were more likely to experience swelling and shift because of their increased capability for higher PCAR or greater size,” explains Ukimura to *Nature Reviews Urology*.

To avoid incomplete destruction of cancer cells in the gaps between HIFU foci, real-time intraoperative adjustment of the treatment plan should be considered. “Compensation treatment might include additional HIFU pinpointed to areas of identified gaps based on intraoperative ultrasonography,” Ukimura suggests. “Alternatively, another cycle of focal HIFU might be needed to target the entire cancer lesion.”

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Original article Shoji, S. *et al.* Prostatic swelling and shift during high-intensity focused ultrasound: Implication for targeted focal therapy. *J. Urol.* doi:10.1016/j.juro.2013.03.116