

Pubic Bone Osteomyelitis after Salvage High-Intensity Focused Ultrasound for Prostate Cancer

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Key Words

Prostate cancer • High-intensity focused ultrasound • Salvage therapy

Abstract

High-intensity focused ultrasound can be used for the primary treatment of prostate cancer and biochemical recurrence after radical prostatectomy or radiation. Complications of high-intensity focused ultrasound include urinary retention, urethral stenosis, stress incontinence, urinary tract infections, dysuria, impotence, and rarely, rectourethral or rectovesicular fistula. We describe a patient presenting with urinary retention, urinary tract infections and intermittent stress incontinence, later found to be associated with pubic bone osteomyelitis stemming from a prostatopubic fistula.

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Introduction

High-intensity focused ultrasound (HIFU), although used less frequently, has been used as a minimally invasive treatment for localized prostate cancer and for biochemical recurrence after radical prostatectomy or radiation. Although the American Urologic Association guidelines do not formally recommend HIFU for the

treatment of prostate cancer, many patients have been treated with this modality, and identifying adverse effects is important. The principle mechanism of HIFU involves the generation of ultrasound waves directed transrectally to the prostatic bed, resulting in focal destruction of prostatic tissue through coagulative necrosis [1, 2]. Known complications from HIFU include urinary retention, urethral stenosis, impotence, stress incontinence, urinary tract infections (UTIs), and rarely, rectourethral or rectovesicular fistula [3–5]. To our knowledge, this is the first reported case of pubic bone osteomyelitis following HIFU therapy for recurrent localized prostate cancer.

Case Report

A 72-year-old Caucasian male with Gleason 6 prostate cancer underwent intensity-modulated radiation therapy (IMRT) as primary treatment in June 2005. The patient responded successfully to IMRT arriving at a prostate specific antigen nadir of 0.40 ng/ml by December 2007.

During routine post-IMRT surveillance, our patient developed biochemical recurrence as defined by the Phoenix criteria in November 2009. The patient elected to undergo HIFU therapy as a salvage procedure for his recurrent prostate cancer in January of 2010. The procedure was well tolerated, however, once the suprapubic catheter was discontinued the patient experienced urinary retention, requiring intermittent catheterization. Cystoscopy revealed a significant amount of sloughed prostatic tissue invading the lumen of the prostatic urethra. The patient elected to under-

go his first of multiple transurethral resections of the prostate 2 months after HIFU. After his first transurethral resection of the prostate the patient experienced occasional urinary retention with intermittent stress incontinence but required fewer self-catheterizations. Unfortunately, the patient progressed from retention, to severe stress urinary incontinence necessitating a penile clamp. The patient was also diagnosed with a proximal urethral stricture in May 2010, which was temporarily treated with dilation.

In October of 2010 the patient began to suffer from recurring UTIs, which were mainly due to *Pseudomonas*. In efforts to provide control for his stress urinary incontinence, an artificial urinary sphincter was placed in August of 2011 but was subsequently explanted in April of 2012 after the patient suffered Foley trauma. Prior to the explant, the patient had been reporting suprapubic, groin and right thigh pain. MRI of the pelvis showed pubic diastasis. During the explant procedure, orthopedics deemed the pubic bone healthy with a minimal amount of purulent material localized to the eroded artificial urinary sphincter cuff. After the surgery, the patient continued to have UTIs caused by *Pseudomonas*. Infectious disease specialists were consulted and determined that the tissue in the prostatic bed became infected after HIFU therapy, causing serial Pseudomonas UTIs.

In November of 2012 the patient began experiencing pelvic pain for which he received a pubic bone biopsy. The biopsy was positive for acute and chronic osteomyelitis with cultures of *Pseudomonas* and *Enterococcus* present. The pubic bone was debrided and impregnated cement spacers were placed. The roof of the prostate was found to be involved with the infected pubic bone through prostatopubic fistula formation. This finding, along with the patient's history of chronic UTIs, artificial urinary sphincter and irradiated tissue, a bladder neck closure with omental flap interposition was performed. The bladder neck closure was successful without injury to the ureteral orifices and a suprapubic tube was placed.

Discussion

HIFU is a treatment modality that is implemented in salvage therapy for recurrent localized prostate cancer. Strong ultrasound waves are generated by a transducer that focuses this energy into a discrete focal point. The tissue absorbs this energy with temperatures exceeding 80°C [4]. HIFU leads to destruction of the focused area of prostatic tissue through coagulative necrosis with minimal damage to adjacent tissue. HIFU is also used for complete prostate ablation. Currently, there are 2 different HIFU device models on the market; The Ablatherm® produced by EDAP TMS and the Sonoblate 500 by Focus Surgery.

The documented complications of HIFU, according to the European Multicentre Study (Thuroff et al. 2003), include impotence (of patients potent preoperatively, 35%), mild-moderate incontinence (14%), UTIs (13.8%), prolonged retention (9%), urethral stenosis (3.6%), severe

incontinence (1.5%) and rarely rectourethral fistula (1.2%) [2, 5, 6]. Our patient experienced several of these complications including urinary retention from prostatic slough, urethral stricture, severe stress incontinence and multiple UTIs. Previously unknown in contemporary literature, we describe development of a prostatopubic fistula resulting in pubic osteomyelitis after salvage HIFU.

Initially the patient presented with multiple UTIs, urinary retention mixed with severe stress incontinence and occasional suprapubic discomfort. Infectious disease concluded that the prostatic bed remained infected months after salvage HIFU. Prostatopubic fistula formation can be attributed directly to the inflammatory nature of HIFU leading to infection. The endoscopic and open manipulation of the genitourinary tract the patient underwent due to HIFU complications could have also been a nidus for fistula formation. Debridement of the infected pubis led to the discovery of the prostatic roof articulating with the pubic bone and subsequent fistula formation between the structures. With the patient's history of chronic UTIs, stress incontinence, and culture positive pubic bone osteomyelitis, a bladder neck closure with omental flap interposition was performed.

Osteomyelitis of the pubic bone was our top differential diagnosis for our patient's occasional complaints of suprapubic discomfort and groin pain. Current literature states that osteomyelitis can be transmitted through exogenous routes such as infected local tissue comparable our patient's prostatic fossa [7]. Diagnosis is often delayed in osteomyelitis of the pubic bone because of its rare occurrence and similarity to osteitis pubis which is solely an inflammatory disease [8]. This case report identifies osteomyelitis of the pubic bone as a rare, but potentially significant, complication of salvage HIFU therapy for prostate cancer.

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