Case Report

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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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
interruption of bother 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 dilatation.

In October of 2010 the patient began to suffer from recurring
UTIs, which were mainly due to \textit{Pseudomonas}. In efforts to pro-
vide control for his stress urinary incontinence, an artificial uri-
nary 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 diast-
asis. 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 sur-
gery, the patient continued to have UTIs caused by \textit{Pseudomonas}.
Infectious disease specialists were consulted and determined that
the tissue in the prostatic bed became infected after HIFU therapy,
calling serial \textit{Pseudomonal 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 
\textit{Pseudomonas} and \textit{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 success-
ful without injury to the ureteral orifices and a suprapubic tube
was placed.

\textbf{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 min-
imal damage to adjacent tissue. HIFU is also used for
complete prostate ablation. Currently, there are 2 differ-
ent HIFU device models on the market; The Ablatherm®
produced by EDAP TMS and the Sonoblate 500 by Fo-
cus Surgery.

The documented complications of HIFU, according to
the European Multicentre Study (Thuroff et al. 2003), in-
clude impotence (of patients potent preoperatively, 35%),
mild-moderate incontinence (14%), UTIs (13.8%), pro-
longed 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 lit-
erature, we describe development of a prostatopubic fis-
tula 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 dis-
ease concluded that the prostatic bed remained infected
months after salvage HIFU. Prostatopubic fistula forma-
tion can be attributed directly to the inflammatory nature
of HIFU leading to infection. The endoscopic and open
manipulation of the genitourinary tract the patient under-
went due to HIFU complications could have also been a
nus for fistula formation. Debridement of the infected
pubis led to the discovery of the prostatic roof articulate-
ing with the pubic bone and subsequent fistula forma-
tion 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 differen-
tial diagnosis for our patient’s occasional complaints of
suprapubic discomfort and groin pain. Current literature
states that osteomyelitis can be transmitted through ex-
genous routes such as infected local tissue comparable
our patient’s prostatic fossa [7]. Diagnosis is often de-
layed 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 iden-
tifies osteomyelitis of the pubic bone as a rare, but poten-
tially significant, complication of salvage HIFU therapy
for prostate cancer.
References


