

Prostate Abscess After Brachytherapy

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Abstract

Brachytherapy (BT) is a form of localized radiation treatment that has been successfully used in the treatment of prostate cancer (PCa), breast cancer, cervical cancer, and skin cancer. It involves short range placement of radiation sources at the site of the tumor which are delivered in protective capsules or seeds preventing the radio-isotopes from gaining access to body fluids, yet allowing their ionizing radiation to locally kill tumor cells. The radioactive seed implantation is commonly used to treat localized prostate cancer with favorable prognosis. Several complications of BT for PCa have been reported in literature including acute urinary retention, incontinence, dysuria, proctitis, seed migration, rectovesical fistula, rectal bleeding, erectile dysfunction, diarrhea, and constipation [1,2]. There is paucity of literature to suggest prostate abscess as a complication of BT. In our case report, we discuss a rare case of a prostate abscess in a 58 year old diabetic male, 5 months after seed implantation.

Keywords: Prostate Cancer; Brachytherapy; Prostate Brachytherapy; Prostate Abscess

Introduction

According to the American Cancer Society, there have been an estimated 174,650 new cases of PCa. It is the second leading cause of cancer death in American men, behind lung cancer, with about 1 man in 41 dying of PCa [3]. The National Comprehensive Cancer Network (NCCN) guidelines currently recommend radical prostatectomy or radiation therapy in the treatment of localized PCa [4].

BT is a form of radiation therapy in which radioactive sources are implanted directly into a malignant tumor. This approach is favorable as it theoretically delivers a high dose of radiation to a confined target volume with relative sparing/minimizing the effects of radiation on the adjacent normal tissue. BT has been successfully used in the treatment of carcinomas of the cervix, breast, endometrium, head and neck, and prostate [5]. However, BT can result in several complications including urethral stricture, urinary incontinence, sexual dysfunction, and rarely prostate abscesses [6].

The purpose of this case report is to share our experience as a consult service managing a patient with a prostate abscess following BT.

Case Report

A 58 year old male presented to the emergency department at our institution with a one week history of deep perineal pain,

rectal pain and constipation. He reported avoidance of bowel movements due to severe pain, and three days prior he had to use a large amount of liquid laxative in order to have a bowel movement. He denied dysuria, urinary urgency, urinary frequency, and any discharge per the urethra. Of note the patient has a history of Type II Diabetes Mellitus, hypertension and PCa, status post BT five months earlier.

On exam he was well appearing, afebrile and non-toxic, with a normal abdominal exam. On digital rectal exam (DRE), there was significant tenderness of the prostate gland with no distinct area of fluctuance.

He underwent an IV contrast CT scan of the abdomen and pelvis with findings of a heterogeneous prostate containing multiple low-attenuation foci, the largest measuring 1 cm. The radiation seeds were visualized and there was no evidence of a rectal abscess (Figure 1).

His labs were remarkable for a leukocyte count of $21.0 \times 10^9/L$, hyponatremia (126mg/dL) and hyperglycemia (486mg/dL).

An intravenous, triple antibiotic regimen that included Levofloxacin, Metronidazole, and Gentamicin was started. The choice of antibiotics was for broad coverage of common organisms that affect the prostate including *E. coli*, *Klebsiella*, *Enterococcus*, *Pseudomonas*

and *Staph. Aureus*. A urine culture and blood culture were also sent for analysis.

Figure 1: Foci of Prostate Abscess seen surrounded by the rim of radiation seeds.

The patient was admitted to the hospital under the General Medicine service due to his electrolyte derangement and hyperglycemia but was followed by the Urology service throughout his stay. The patient remained hemodynamically stable, afebrile, and continued to have no discharge from his urethra. However, on hospital day (HOD) 2, his white blood cell count had increased to $31.0 \times 10^9/L$ while on the triple IV antibiotic regimen.

A repeat CT scan, seen below, showed similar findings and the patient was taken to the operating room for an emergent transurethral resection of prostate (TURP).

Figure 2: Foci of Prostate Abscess seen surrounded by the rim of radiation seeds.

The procedure was uncomplicated and a resectoscope was used to remove prostate tissue until a small pocket of abscess was discovered in the right lateral lobe. About 5-10cc of purulent fluid was obtained and sent for culture. The patient returned to the surgical ward without event.

The patient remained on the triple antibiotics until HOD 3 when his urine culture grew group B *Streptococcus Agalactiae*, sensitive to Vancomycin and Penicillin. The patient's antibiotic regimen was narrowed to Vancomycin and Levaquin.

His leukocyte count gradually decreased, down to $11.0 \times 10^9/L$ on HOD 12 and he was transitioned to oral Levaquin, with a discontinuation of Vancomycin. Culture reports from the purulent fluid obtained during the TURP also grew *Streptococcus Agalactiae*. The patient was discharged from the hospital on HOD 14 with a WBC of $12.0 \times 10^9/L$ with a 4-week course of oral Levaquin.

Figure 3: White blood cell count trend during hospital stay.

Discussion

The NCCN currently recommends treating localized PCa with either radical prostatectomy or radiation therapy [4]. One form of radiation therapy that has become increasingly used to treat localized PCa is BT, due to its ability to deliver high dose radiation localized to the prostate.

Furthermore, outcomes of BT are similar to other treatments of PCa, including external beam radiotherapy (EBRT) and surgery [6]. Low-Dose-Brachytherapy (LD-BT) yields excellent survival rates with low risks of significant long-term genitourinary or gastrointestinal morbidities, especially in patients below sixty years of age with low or intermediate risk PCa [7,8]. In addition, High-Dose-Brachytherapy (HD-BT) has been shown to be well tolerated, safe, and effective for treatment of PCa [9,10].

Despite its efficacy, BT can result in certain complications. The most common complications include urethral stricture, persistent urinary retention requiring further procedures, or urinary incontinence [6,11]. BT related erectile dysfunction has also been reported as a common long-term complication, although it occurs less often in patients undergoing LD-BT [12]. More severe, complications such as recto-urethral fistulization or bladder neck contracture, are possible but rarely occur [13,14].

Prostate abscess after BT is another rare complication of BT, and should be considered as a late complication of radiation seeds

[15]. In a prospective study, Nguyen, *et al.* found the incidence of prostatic or periprostatic abscess in patients post BT to be approximately 4% [16]. The index of suspicion for a prostate abscess after undergoing BT should be entertained with deep rectal pain, tenderness of the prostate on DRE, fluctuance on DRE, and leukocytosis. Furthermore, approximately half of patients will have a positive urine culture, but frank urethral discharge is rare [17].

Our patient, who underwent BT for localized PCa five months prior, initially presented with perineal pain, rectal pain, and prostate tenderness. He was ultimately diagnosed with a prostate abscess after undergoing CT imaging and labs revealed leukocytosis. During his fourteen day hospital stay he was successfully treated with broad spectrum IV antibiotics and drainage of the abscess cavity via TURP, before being discharged with a four week course of Levaquin.

Conclusion

There are several complications associated with BT including urethral stricture, urinary incontinence, and sexual erectile dysfunction. Rarely patients may experience bowel related symptoms and prostate abscesses [11]. However, given BT's continued evolution, low cost, and favorable oncologic outcomes, it offers an excellent treatment option for definitive and salvage treatment of prostate cancer. Furthermore, consistent follow up with patients treated with BT can help ensure proper prevention, diagnosis, and treatment of any complications that may arise [6].

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