Holmium laser enucleation of the prostate for a case of transition zone prostate cancer

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LI MK, DIAZ O, KATZ JE. Holmium laser enucleation of the prostate for a case of transition zone prostate cancer. *Can J Urol* 2024;31(2):11861-11863.

Standard treatment approaches for localized prostate cancer remain limited to active surveillance, radiotherapy, and radical prostatectomy. We present a case of transition zone prostate cancer that was treated with holmium laser enucleation of the prostate, a procedure that is normally reserved for the management of benign prostatic hyperplasia.

Key Words: holmium laser, ablation, laser, cancer of the prostate, contact laser ablation of prostate

Introduction

According to the National Comprehensive Cancer Network Guidelines for the initial treatment of localized prostate cancer treatment options include active surveillance, radiotherapy, and radical prostatectomy.[1] Though prostate cancer is incidentally diagnosed following approximately 10% of holmium laser enucleation of the prostate (HoLEP) procedures;[2] it is not recommended for the primary treatment of prostate cancer, even when the prostate cancer is confined to the transition zone (TZ). Instead, HoLEP is primarily recommended for the treatment of benign prostatic hyperplasia (BPH).[3] However, one reason many have advocated for it as the gold-standard is because during the procedure the entire TZ is enucleated.[3] Herein we report the first documented case of TZ prostate cancer treated primarily with HoLEP. Of note, the patient was extensively counseled that the treatment was against prostate cancer guidelines, however he felt it to be a logical and an effective means to simultaneously resect the cancerous tissue while limiting the deleterious side effects of guideline-approved prostate cancer treatments such as urinary leakage and erectile dysfunction.

Accepted for publication March 2024

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Case report

A 76-year-old man, with a past medical history significant for BPH with urinary retention for which he underwent a partial HoLEP (median and right lobe only – benign pathology) 6 months prior presented to our clinic. Of note, his initial partial HoLEP was complicated by a fossa navicularis stricture managed by self-dilations. Nonetheless, he voided with a strong stream and had no urinary incontinence or other bothersome lower urinary tract symptoms (LUTS). However, he had a persistently elevated PSA of 15.20. We ordered a prostate MRI which was significant for a prostate volume of 124 cc (mostly left lateral lobe) and an irregular TZ with heterogenous tissue with obscured margins that is atypical for BPH. The most suspicious area was located at the left posterior TZ at the apex and compatible with a PI-RADS 4 lesion, Figure 1. A transrectal MRI fusion prostate biopsy

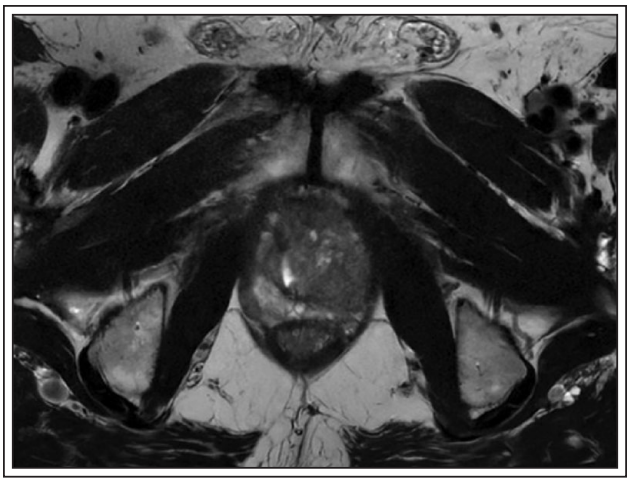

Figure 1. Pre-treatment prostate MRI.
This figure shows the pre-treatment T2 axial view of prostate MRI, demonstrating the irregular TZ with heterogenous tissue with obscured margins. The left posterior TZ at the apex is marked and was characterized as a PI-RADS 4 lesion.

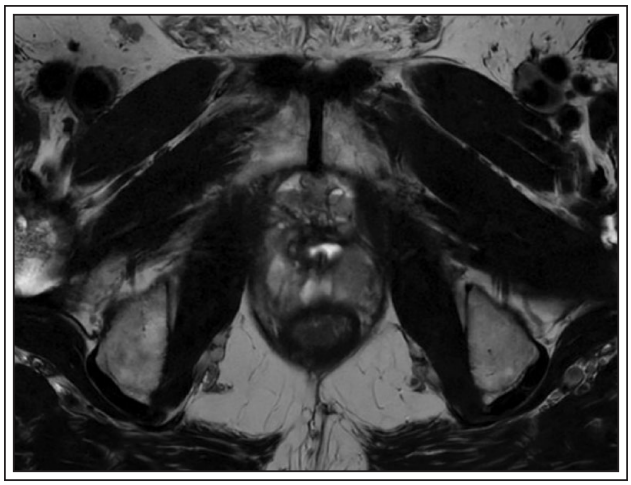

Figure 2. Post-treatment prostate MRI.
This figure shows the post-treatment T2 axial view of prostate MRI, demonstrating resolution of the prior suspicious TZ lesion.

was subsequently performed, demonstrating Gleason grade group 2 prostatic adenocarcinoma, in one of four targeted cores. The remaining 12 template biopsies were all benign.

Given his unfavorable intermediate prostate cancer, we performed a PET/CT PSMA to rule out metastatic prostate cancer, which was noteworthy only for prostatomegaly with increase uptake in right posterolateral gland. He was counseled on the different treatment options including radiation therapy, radical prostatectomy, as well as common alternative treatments such as cryotherapy, and high intensity focused ultrasound. However, despite the fossa navicularis stricture, the patient was satisfied with his outcome from his prior partial HoLEP and pointed out that a completion HoLEP of his remaining left lateral lobe would likely extirpate his cancer. He was counseled that often the boundary between the sphincter and adenoma is not well delineated, which may be further obfuscated by cancerous tissue in this region. Another limitation would be that no margin would be obtained to verify that the entire cancer was removed. Finally, a review of the literature resulted in no case reports utilizing HoLEP for prostate cancer. Nonetheless the patient preferred to undergo a completion HoLEP. He understood that if his PSA did not decrease, he would further need treatment.

Operative findings were significant for an 18-French urethral meatus serially dilated with male sound surgically absent median and right prostatic lobes, and a large left prostatic lobe that was enucleated. The border between the external sphincter and the apical prostatic tissue was easily identifiable and a complete enucleation was performed. The patient tolerated the procedure well with no postoperative complication. His foley catheter was removed on postoperative day 1 and was discharged once he voided. Pathologic results showed 64 grams of tissue resected with 5 of 200 cores containing Gleason grade group 2 prostatic adenocarcinoma. At 6 weeks the patient followed up with an even stronger urinary stream, no stress urinary incontinence and a PSA of 1.15 ng/mL. Given the persistently elevated PSA, we obtained a repeat MRI, which showed no suspicious lesions and a prostate volume of 27 cc, Figure 2. Given the persistently elevated PSA following HoLEP, the patient was offered radiation therapy versus serial PSAs. He preferred to trend his PSA. Now, 6 months postoperatively his PSA has further declined to 0.78 ng/mL.

Discussion

Although HoLEP has been found to incidentally diagnose prostate cancer in 10%-15% of men with a negative elevated PSA work up, its use remains limited to the treatment of BPH.[2,3] Current treatment guidelines for localized prostate cancer remain limited to active surveillance, radiotherapy, and radical prostatectomy.[1] Despite the frequency of incidental prostate cancer diagnosis in HoLEP patients, few studies have evaluated the utility of HoLEP in the treatment of prostate cancer. One retrospective study found that HoLEP may be a

feasible, minimally invasive option for patients with localized prostate cancer and LUTS, but as a treatment for LUTS rather than the localized prostate cancer.[4] In our case, our patient had likely localized prostate cancer and LUTS and was interested in pursuing HoLEP as a definitive treatment. He was counseled on the possibility of requiring further treatment should there be concerns of incomplete resection based on his MRI and PSA. Postoperatively, his PSA decreased significantly; however, it remained higher than the expected post-HoLEP nadir of 0.6 ng/mL,[5] but his prostate MRI was unremarkable for suspicious lesions. Furthermore, our patient had TZ prostate cancer, which has been shown to have better prognosis compared to peripheral zone prostate cancer and therefore, conservative managements may be favorable.[6] As such, he did not undergo further treatments after his HoLEP. It is important to note that in our patient, a transrectal MRI fusion prostate biopsy was performed to confirm the diagnosis. For future patients interested in HoLEP treatment for TZ prostate cancer, a transperineal approach may be preferred due to its higher likelihood of detecting prostate cancer located in the apex, TZ, and anterior zone.[7] However, given the resolution of our patient's PI-RADS 4 lesion on MRI and significant decrease in PSA level postoperatively, a transperineal approach would not have likely changed his outcome. Therefore, the decision to utilize a transperineal versus transrectal approach should be decided based on patient risk factors and imaging results.

To our knowledge, this is the first report of the use of HoLEP for the treatment of localized TZ prostate cancer. Six months after his HoLEP, his repeat prostate MRI demonstrated no evidence of suspicious lesions, and his PSA continues to decrease. We acknowledge that more time is needed to evaluate the outcome of our patient. Furthermore, given the novelty of this approach, additional research is needed to define cure in patients with localized TZ prostate cancer that is treated with HoLEP. However, we feel this case underscores a potentially effective treatment for a subset of patients with prostate cancer limited to the TZ, especially with patients with comorbid LUTS. Further studies are needed to determine if this is a safe and durable treatment for prostate cancer isolated to the TZ.

Conclusion

We believe that HoLEP is a safe treatment for prostate cancer isolated to the TZ. Further prospective randomized studies are warranted comparing HoLEP to radiation therapy and surgery for isolated prostate cancer in the TZ. □

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