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Robotic Assisted Laparoscopic Prostatectomy Post-Prostatic Urethral Lift Implants

Matthew R. DeSanto, MD[1,2]* and Daniel J. Ricchiuti, MD[1]

1. *Northeast Ohio Medical University, College of Medicine, Rootstown, OH, 44272*
2. *Department of Urology, Charleston Area Medical Center, Charleston, WV, 25304*

** Corresponding author*

ABSTRACT

Prostate cancer is the second most commonly diagnosed form of cancer in men. While there are several treatment options for prostate cancer, robotic assisted laparoscopic prostatectomy is a customary option in the treatment of clinically localized disease. It entails prostate removal using the Intuitive da Vinci surgical system. Another very prominent urologic condition affecting older males is benign prostatic hyperplasia (BPH); BPH has an increased lifetime prevalence reaching 80% of men by the 9th decade of life. It is characterized by lower urinary tract symptoms due to prostatic enlargement. These conditions often develop concomitantly in males given the high prevalence of each. Surgical advancements such as the prostatic urethral lift (PUL) system are becoming more commonly utilized. However, patients with benign prostatic hyperplasia who independently develop clinically significant prostate cancer may necessitate definitive management, namely prostatectomy. In this case report, we discuss a 67-year-old male presenting with Gleason group 2 (3+4=7) prostate cancer with previous PUL implants, who then underwent robotic assisted laparoscopic radical prostatectomy. Prostatectomy following prior PUL implantation has never been fully discussed in the literature, and there are no intraoperative or postoperative complications from prostatectomy to report thus far.

Keywords: Prostatectomy, Prostate Cancer, Benign Prostatic Hyperplasia, Prostatic Urethral Lift

INTRODUCTION

Prostate cancer is one of the most pervasive oncologic and urologic conditions that males endure. It is the second most commonly diagnosed cancer in males, second only to lung cancer (*1*). Depending on patient presentation and prostate cancer grading, options such as prostatectomy or radiation therapy may be pursued. There are many factors for clinicians to consider in the course of prostate cancer workup, and grading methods such as the Gleason grade and score remain the gold standard. Gleason grading is comprised of two Gleason scores. The Gleason system is a scoring system from 1-5, where 1 most histologically represents normal prostate cells and 5 is most resemblant of high-grade cancerous cells *(2)*. The first number is the most predominant type of cell from the biopsy, and the second number is the second most predominant. Grade 1 is a scoring of 3+3=6, Grade 2 is 3+4=7, Grade 3 is 4+3=7, Grade 4 is 4+4=8, and Grade 5 is any score equating to 9 or 10 total. Gleason scoring, prostate-specific antigen, patient history, and physical exam are all essential for the diagnosis and treatment plan of prostate cancer.

BPH is another frequently diagnosed urologic condition. As the name suggests, BPH is a proliferation of smooth muscle and epithelial cells within the prostatic transition zone typically due to increased levels of androgens *(3)*. Due to this enlargement, outflow from the bladder to the proximal urethra can be greatly diminished. Men may experience more lower urinary tract symptoms (LUTS) as the prostate tissue grows. LUTS constitutes symptoms of urinary urgency, frequency, straining, nocturia, and intermittency of urinary stream (*4*). The prostatic urethral lift system is a novel therapy intended for the treatment of BPH.

The PUL system was first studied in 2011 and since then has obtained FDA approval in the United States and the United Kingdom as a minimally invasive therapy for BPH (*5*). The PUL procedure is unique in comparison to other endoscopic treatments for BPH in that the technology is mechanical rather than cavitating or ablative, such as transurethral resection of the prostate (TURP) (*6,7*). TURP has historically been the "gold standard" surgical procedure for relief of BPH. As mentioned, TURP is an ablative procedure that entails highly charged electroresection to remove prostate tissue (*8*). With PUL, non-absorbable implants are placed transurethrally to lift and hold enlarged prostate tissue in order to increase the urethra's lumen and decrease outflow obstruction (Fig. 1). This system has become increasingly more popular as an alternative to TURP and other surgical BPH treatment options, given the lower incidence of side effects coupled with favorable sexual, urinary, and functional outcomes *(9)*. Now, if patients have a large median prostatic lobe or if total prostate volume is greater than 80 grams, patients are not candidates for PUL. Regardless, PUL has become increasingly more utilized.

The TURP procedure, and now PUL, aim to relieve LUTS secondary to BPH. However, patients undergoing these procedures may still develop prostate cancer concomitantly that is unrelated to their BPH. Typical management options for prostate cancer, such as active surveillance, prostatectomy and radiation therapy, are logical to consider for these patients. Specifically, robotic assisted laparoscopic prostatectomy has become increasingly employed compared to open prostatectomy. Robotic prostatectomy offers many benefits such as improved surgical view, reduced blood loss, and lower incidence of urinary incontinence and erectile dysfunction when compared to open technique (*10*). While the L.I.F.T study briefly mentions two instances of prostatectomy after PUL at 2 and 5 year follow-ups, this is not discussed in depth (*11,12*). There are currently no case reports in the literature detailing the full course of prostatectomy after the placement of PUL devices.

CASE REPORT

This case report details a 67-year-old otherwise healthy male who was in active surveillance for low risk prostate cancer. He was diagnosed with low volume Gleason grade 3 prostate cancer in 2013, and elected to be managed with active surveillance. Surveillance magnetic resonance imaging (MRI) of the prostate seven years later revealed a 47-gram prostate with a new nodular mass measuring 11mm.

Additionally, four PUL implants were placed for BPH relief at an outside institution in 2019, aligning with standard recommendations of 4-6 implants. The patient continued to experience LUTS such as hesitancy, nocturia, and weak urinary stream. Three supplementary PUL implants were placed in 2020 in response to his persistent symptomology.

Given the concerning MRI findings, the patient was re-biopsied for evaluation of prostate cancer approximately three months after the additional implants. The repeat biopsy revealed Gleason grade 2 (3+4=7) prostate cancer. Furthermore, Decipher testing, which is a genomic test to help further stratify biopsied prostate cancer and guide treatment management, indicated the cancer was clinically significant high-risk disease (*13*). The results of this test further ascertained the need for definitive prostate cancer treatment.

We discussed with the patient how our literature search showed minimal information regarding prostatectomy following PUL implants. The patient was scheduled for robotic assisted laparoscopic radical prostatectomy at the end of 2020. Emphasis was made to identify the PUL implants when dissecting the prostate. In total, seven PUL implants were identified. There was little difficulty identifying the urethral end piece and the capsular tab of each prostatic urethral lift device. The urethral end piece is considered the inner portion of the device while the capsular tab is the outer metallic clip. Care was taken to minimize cautery usage around the clip as this resulted in arcing. There were no abnormal fibrotic tissue changes surrounding the implants; dissection and extraction of the implants were not problematic. The capsular tabs were disconnected from the suture and were individually removed. The urethral end pieces and sutures from the seven PUL implants were left with the prostate specimen. The remainder of the operation and dissection was uneventful for robotic prostatectomy. Vesicourethral anastomosis was achieved without any unexpected difficulties. There was no other evidence of inflammation or adherence surrounding the prostate in the surgical field of view. There was no additional challenge encountered to nerve-sparing technique.

DISCUSSION

Findings recorded in this case report are significant because there was an absence of difficulties, and radical prostatectomy performed as usual despite the prior placement of PUL implants. It was theorized that there may be increased adhesions surrounding the prostate given the presence of foreign bodies, making dissection more difficult. Moreover, we were unsure how the implants would affect our ability to use electrocautery for extraction. This patient also had three additional implants due to continual LUTS.

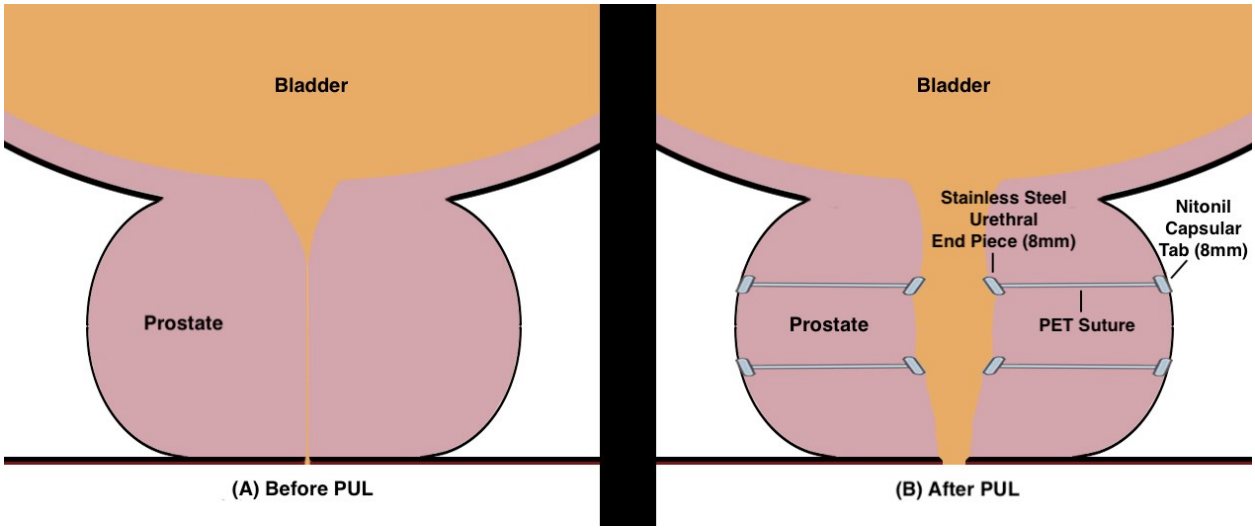

Figure 1. Benign prostatic hyperplasia before prostatic urethral lift implantation (a) and following four prostatic urethral lift implants (b). (A) Diagram showing an enlarged prostate that significantly obstructs urinary tract outflow from the bladder through the urethra. (B) Placement of four prostatic urethral lift implants to unobstruct urinary flow.

Usually patients do not require additional PUL implants, so this did add some consideration in regard to more adhesions. However, the number of implants did not greatly impact the decision to pursue prostatectomy as this was necessary to treat the patient's prostate cancer. Ultimately, the patient tolerated the procedure well and has been seen in the postoperative period. He is currently without clinical evidence of prostate cancer recurrence. The patient has had minimal LUTS and incontinence post-surgery. He has not reported significant worsening of sexual function following prostatectomy.

The absence of unexpected events is encouraging as the prostatectomy was performed safely and efficiently without compromising surgical technique. Prostate cancer and BPH are both highly prevalent urologic conditions. It is common for both pathologies to develop concomitantly. Therefore, as the PUL procedure becomes more widely adopted for BPH relief, it is reasonable for urologists to expect to encounter patients with PUL implants that have later developed prostate cancer.

It would be advantageous to see additional case reports of prostatectomy in patients with BPH who received PUL implants. Specifically, seeing how different Gleason grades affected the ability to extract the implants during prostatectomy, if at all, would be beneficial.

CONCLUSION

This is the first known case report of radical prostatectomy in a patient with PUL implants in place. Without other significant literature, it was uncertain what complications or challenges would be faced in the surgical setting. Prostatectomy was performed for this patient without deviation from standard operative technique. Furthermore, there are no intraoperative or postoperative complications to report following prostatectomy thus far. This case report will aid urologists in their decision-making when similar clinical scenarios arise. Our case shows that prostatectomy in the setting of prior PUL implantation is feasible and, in this case, added no additional challenge to robotic prostatectomy.

REFERENCES

1. American Cancer Society. Key Statistics for Prostate Cancer. Published January, 12, 2021. Accessed June 25, 2021. https://www.cancer.org/cancer/prostate-cancer/about/key-statistics.html

2. Epstein JI, Egevad L, Amin MB, Delahunt B, Srigley JR, Humphrey PA. The 2014 International Society of Urological Pathology (ISUP) Consensus Conference on Gleason Grading of Prostatic Carcinoma: Definition of Grading Patterns and Proposal for a New Grading System. *Am J Surg Pathol*. Feb 2016;40(2):244-52. doi:10.1097/pas.0000000000000530

3. Wein, AJ, Kavoussi, LR, Campbell, MF. *Campbell-Walsh Urology*. 12th ed. Philadelphia, PA: Elsevier Saunders. 2020.

4. Parsons JK. Benign Prostatic Hyperplasia and Male Lower Urinary Tract Symptoms: Epidemiology and Risk Factors. *Curr Bladder Dysfunct Rep*. Dec 2010;5(4):212-218. doi:10.1007/s11884-010-0067-2

5. Jones P, Rai BP, Aboumarzouk O, Somani BK. UroLift: a new minimally-invasive treatment for benign prostatic hyperplasia. *Therapeutic advances in urology*. 2016;8(6):372-376. doi:10.1177/1756287216671497

6. Garcia C, Chin P, Rashid P, Woo HH. Prostatic urethral lift: A minimally invasive treatment for benign prostatic hyperplasia. *Prostate international*. 2015;3(1):1-5. doi:10.1016/j.prnil.2015.02.002

7. Bozkurt A, Karabakan M, Keskin E, Hirik E, Balci MB, Nuhoglu B. Prostatic Urethral Lift: A New Minimally Invasive Treatment for Lower Urinary Tract Symptoms Secondary to Benign Prostatic Hyperplasia. *Urol Int*. 2016;96(2):202-6. doi:10.1159/000441850

8. Teo JS, Lee YM, Ho HSS. An update on transurethral surgery for benign prostatic obstruction. *Asian journal of urology*. 2017;4(3):195-198. doi:10.1016/j.ajur.2017.06.006

9. Perera M, Roberts MJ, Doi SA, Bolton D. Prostatic urethral lift improves urinary symptoms and flow while preserving sexual function for men with benign prostatic hyperplasia: a systematic review and meta-analysis. *Eur Urol*. Apr 2015;67(4):704-13. doi:10.1016/j.eururo.2014.10.031

10. Finkelstein J, Eckersberger E, Sadri H, Taneja SS, Lepor H, Djavan B. Open Versus Laparoscopic Versus Robot-Assisted Laparoscopic Prostatectomy: The European and US Experience. *Reviews in Urology*. 2010;12(1):35-43.

11. Roehrborn CG, Gange SN, Shore ND, et al. Durability of the Prostatic Urethral Lift: 2-Year Results of the L.I.F.T. Study. *Urology Practice*. 2015;2(1):26-32. doi:doi:10.1016/j.urpr.2014.08.001

12. Roehrborn CG, Barkin J, Gange SN, et al. Five year results of the prospective randomized controlled prostatic urethral L.I.F.T. study. *Can J Urol*. Jun 2017;24(3):8802-8813.

13. Dalela D, Löppenberg B, Sood A, Sammon J, Abdollah F. Contemporary Role of the Decipher® Test in Prostate Cancer Management: Current Practice and Future Perspectives. *Reviews in urology*. 2016;18(1):1-9.

CONFLICTS OF INTEREST

All authors declare no conflicts of interest.

AUTHOR CONTRIBUTIONS

Conceptualization: MRD, DJR

Methodology: MRD, DJR

Investigation: MRD, DJR

Visualization: MRD, DJR

Project administration: MRD, DJR

Supervision: DJR

Writing – original draft: MRD

Writing – review & editing: MRD, DJR