How I do it: Same day discharge for transurethral resection of prostate using Olympus PlasmaButton and PlasmaLoop

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Benign prostatic hyperplasia (BPH) is one of the most common conditions affecting older men. Transurethral resection of the prostate (TURP) has widely been considered the gold standard in surgical treatment for BPH. However, this procedure remains largely an inpatient procedure. Inpatient admission ultimately adds to healthcare cost and patient morbidity. In this article, we present an alternative methodology to treat BPH using combination Olympus PlasmaButton and Olympus PlasmaLoop therapy. Preliminary results from our experience suggest improved hemostasis with adequate resection, allowing a majority of our patients to be discharged the same day of the procedure. We describe our novel technique as a safe and effective way to possibly treat BPH in an outpatient setting.

Key Words: benign prostatic hyperplasia, monopolar-transurethral resection of prostate, bipolar-transurethral resection of prostate, transurethral resection of prostate, continuous bladder irrigation, transurethral vaporization of prostate

Introduction

Benign prostatic hyperplasia (BPH) is one of the most prevalent conditions affecting men. Berry et al[1] summarized data from five studies and found that 50% of men between ages 50 and 60 had evidence of BPH. The disease negatively impacts quality of life due to symptoms of chronic obstruction and irritation. Conventional transurethral resection of the prostate has been considered the gold standard in surgical management.[2-4] While technological advances and improved methods have increased the safety for monopolar transurethral resection of prostate (M-TURP) procedures, the risk for intraoperative bleeding and electrolyte disturbances such as hyponatremia remained. In response, bipolar transurethral resection of the prostate (B-TURP) has emerged to address electrolyte abnormalities resulting from surgery. However, bleeding may still be a significant complication that contributes to prolonged hospital admissions and time to discharge. One study found no significant differences in frequency of blood transfusion between M-TURP and B-TURP, which may suggest that bleeding remains a significant complication.[5] In recent years, the Olympus PlasmaButton (Olympus America Inc. Southborough, MA, USA) was introduced as a minimally invasive

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surgical instrument to treat BPH. Studies have found that the new modality has shown improved hemostasis, largely due to the spherical shape of the electrode which features coagulation with concurrent vaporization as well.[6,7] Studies examining feasibility and effectiveness remain limited. Standard postoperative management typically involves hospitalization for continuous bladder irrigation and monitoring of hematuria. Our surgical methods incorporate the use of both the Olympus bipolar loop, as well as the PlasmaButton for enhanced hemostasis, which may help patients meet discharge criteria more quickly compared to the use of one bipolar electrode alone. We hope our methods will suggest an improved alternative to traditional B-TURP by lowering the rate of postoperative hospitalizations and reducing unnecessary costs associated with inpatient procedures.

Patient selection

Patients are first seen and evaluated in the office prior to surgical intervention. History and physical exam are performed. Routine tests such as urinalysis, post void residual, uroflow and flexible cystoscopy are performed. One of the most common indications for the procedure is that the patient has failed or cannot tolerate or does not want medical therapy for BPH. Patients deemed to be appropriate surgical candidates are counseled and consented for the procedure. Common risks of the procedure including bleeding, infection, retention, and urgency and frequency are discussed with the patient. Urine culture is obtained prior to surgical intervention. Should cardiology evaluation be deemed necessary per the surgeon's judgment, this is also obtained. For those patients who are on anticoagulation or anti-platelet therapy (dabigatran, warfarin, clopidogrel, etc), they are instructed to hold the medication 5-7 days prior to the procedure per approval of their cardiologist. On the day of surgery, the patient is given preoperative antibiotics, induced under anesthesia, typically via laryngeal mask airway, and placed in the dorsal-lithotomy position.

Methods

To begin the operation, cystoscopy is first performed with first the 30 degree and 70 degree lens Olympus rigid cystoscope to view the size and shape of the prostate, as well as to identify the location of the ureteral orifices and proximity to the bladder neck. This is also done to ensure that there are no stones or bladder tumors that were not seen with the office flexible cystoscopy. If a bladder tumor were to be found, this would be resected and then prostate resection would be rescheduled for another day due to the risk of tumor implantation. If a stone or stones were found, they could be broken up and removed with a laser and the B-TURP could proceed. The rigid cystoscope is then removed and the Olympus resectoscope is re-introduced into the bladder. Ureteral orifices are again identified. Only room temperature saline is used for the resection instead of warmed saline, as anecdotally, it seems to decrease intraoperative bleeding and helps with hemostasis. First, the bipolar loop is used, Figure 1, to resect the bladder neck in a circumferential manner and then any median lobe. The resection is then performed on each lateral lobe until the majority of the adenoma is resected beginning at the 12 o'clock position, carrying the resection down, but not distal to, the level of the verumontanum. Finally, any apical tissue remaining is resected. The goal of the resection is to remove the majority of the prostatic tissue as in a standard M-TURP. If more significant bleeding than normal is encountered, another advantage is that the switch to PlasmButton can be made earlier to both control bleeding and finish the TURP with vaporization. Bladder drainage is performed at the physician's discretion to decompress the bladder, or more commonly continuous inflow and drainage are utilized during the resection. Prostatic chips are pushed into the bladder during the resection and are allowed to passively irrigate out of the bladder by simple drainage as the resectoscope is removed intermittently from the sheath. Remaining chips can then be physically trapped between the loop and the scope and removed manually, without the use of a Toomey syringe or Ellik irrigator as this, in anecdotal experience, tends to initiate or promote more bleeding.

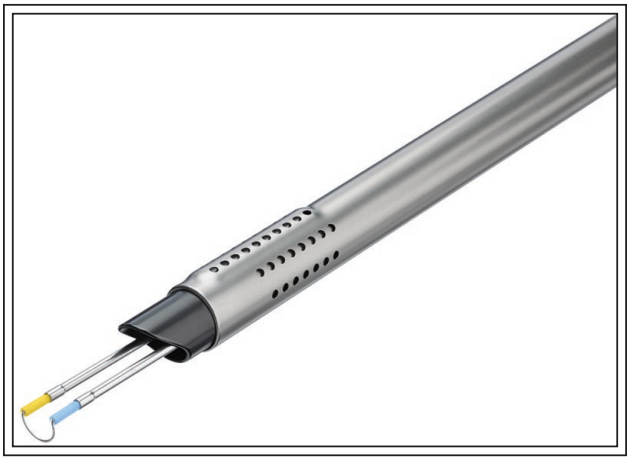

Figure 1. Olympus' PlasmaLoop with bipolar energy.

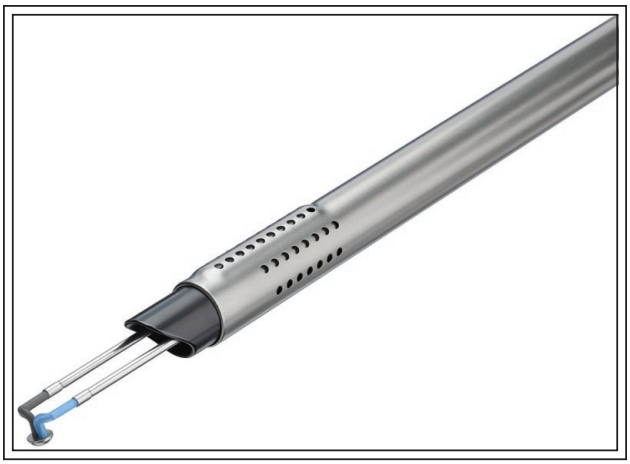

Figure 2. PlasmaButton.

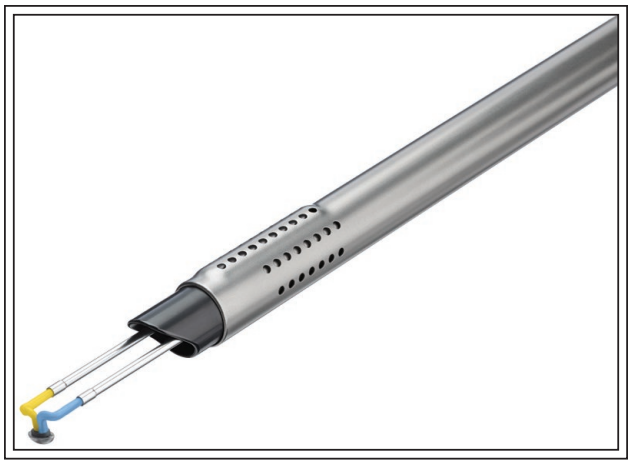

Figure 3. Plasma-OvalButton.

Once all chips have been removed from the bladder, the bipolar loop is then removed and the PlasmaButton, Figure 2, is then engaged into the working element of the scope and further vaporization of the prostate is then carried out over the resection sites. The advantage of the vaporization is two-fold. First, it allows for smoothing of the resection bed through vaporization and then aids in better hemostasis than the bipolar loop. The resectoscope set up remains the same, only requiring switching the electrode from the loop to the button, which provides simple and convenient versatility to the procedure. Once an appropriate amount of prostate tissue has been resected and subsequently vaporized, the PlasmaButton is then used to isolate and cauterize any obvious arterial source of bleeding. Once arterial bleeding has been addressed, the entire resection bed is then cauterized in circumferential manner, starting at the bladder neck proceeding distally to the resected edge near the verumontanum. A visible blanching of the prostatic tissue is seen. At this time, all inflow and drainage is turned off to ensure hemostasis has been achieved. If no further cauterization with the PlasmaButton is required, the scope is then removed and a 22 French three-way catheter is then inserted into the bladder and continuous bladder irrigation is initiated on a slow to moderate drip.

Continuous bladder irrigation (CBI) is then utilized for approximately 30 minutes in the post-anesthesia recovery unit and then discontinued. A catheter plug is placed in the three-way irrigation port of the Foley. If the urine remains clear, and the patient is otherwise stable, he is then discharged with follow up in 1-2 days for catheter removal and trial of void in the office. Length of time with catheter postoperatively is up to the judgment of the surgeon as patients in urinary retention prior to the operation may require a longer catheterization period. Routine labs are not drawn prior to discharge.

Furthermore, a new addition to the plasma portfolio of electrodes is the Plasma-OvalButton, Figure 3, which has shown promise in the attending surgeons practice to be an even more efficient tool than the current PlasmaButton model.

Discussion

The PlasmaButton has been an excellent addition to the urologist's armamentarium for treatment of BPH. A previous study has demonstrated its effectiveness in obtaining adequate hemostasis and resection during transurethral vaporization (TUVP).[4] To date, we have not identified any study within the literature that describes the unique combination of using the bipolar loop in conjunction with the PlasmaButton to perform outpatient TURP. We describe a novel technique that potentially decreases operative time and provides equal effectiveness with hemostasis as well as preventing inpatient admission.

A total of 104 men underwent TURP procedures in 2011 to 2014 using the aforementioned technique. All procedures were performed and supervised by a single attending physician. Mean age of the sample was found to be 71 (r = 48-88). All procedures were performed at one of three surgical centers in Metropolitan Detroit.

During the 3 year period, 85 out of 104 (81.7%) men were discharged as an outpatient on day 0 with Foley catheter. Nineteen were discharged on subsequent postoperative days. The mean number of days until

discharge was 2.32 (SD = 2.38) for those admitted. All patients admitted were done so for hematuria requiring further continuous bladder irrigation. None of the patients required blood transfusion. Foley catheter was removed on postoperative day 1-2 for patients in which there were no other compounding factors. For patients in complete retention, surgeon discretion dictated the postoperative timing of Foley catheter removal.

One case was complicated by sepsis secondary to a genitourinary source and documented in the immediate postoperative period. Seven patients in total returned to the emergency department in the 30 day postoperative period. Four ultimately required readmission. The most common reasons for these emergency department visits included hematuria, urinary retention, and urinary frequency.

Overall, we found that the combined use of both modalities also allowed for more efficient resection of prostate adenoma, due to better visualization from less bleeding, especially for larger glands. Ultimately, this decreases operative time and length of anesthesia. Another advantage over other minimally invasive techniques is that due to tissue resection, pathologic evaluation is routinely performed.

Conclusion

We argue that the use of the bipolar loop in conjunction with the PlasmaButton for TURP can be routinely done on an outpatient basis in a safe, effective and time-saving modality for treatment of BPH. We have not identified any current studies within the literature that use this same technique. This unique combination technique makes this therapy competitive against all other new minimally invasive treatment options and can routinely be scheduled as an outpatient procedure.

Disclosure

Dr. Kernen is a paid consultant to Olympus America Inc., Medical Systems Group (Olympus). Olympus did not draft, edit, or provide any substantive input on this article. □

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