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RESEARCH ARTICLE

Efficacy of Bipolar Radiofrequency Thermotherapy in Elderly Patients with Refractory Urinary Retention Due to Benign Prostate Hyperplasia: A Pilot Study

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ABSTRACT

Objective: The prevalence of benign prostatic hyperplasia (BPH) will increase after the age of 40 years, with an occurrence of 8–60% at age 90 years. The presence of comorbid illnesses became the main reason for the selection of minimally invasive surgical techniques for the treatment of BPH. The aim of this study was to investigate the efficacy of bipolar radiofrequency (BRF) thermotherapy of refractory urinary retention secondary to BPH in patients with comorbidities.

Materials and Methods: Between May 2017 and September 2019, the BRF thermotherapy system was used in 13 patients with permanent urethral catheter requiring surgical treatment for BPH, who either could not undergo surgery due to their comorbidities. The outcomes of patients were retrospectively analyzed. The mean age of patients was 79.92±6.38 years (67–90). The mean prostate volume and prostatic urethra length of patients was 62.92±11 ml (43–80) and 31.38±11.02 (23–40) mm, respectively. The mean follow-up was 10.69 months.

Results: A total of 13 patients were evaluated for success of treatment in eliminating the need for a permanent urinary catheter. Only one patient no longer required urinary catheter (0.76%). Two patients with unsuccessful treatment had transurethral resection of the prostate. One patient required blood transfusion due to severe hematuria 6 months after surgery. The other patients with unsuccessful BRF thermotherapy were monitored with permanent urethral catheter for refractory urinary retention.

Conclusion: BRF thermotherapy is an alternative treatment modality for the patients with a high anesthesia risk. However, the level of efficacy of this technique for patients with refractory urinary retention due to BPH should be evaluated with high number of cases.

Keywords: Benign prostate hyperplasia, bipolar radiofrequency thermotherapy, refractory urinary retention, urethral catheter

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INTRODUCTION

Benign prostatic hyperplasia (BPH) is one of the most frequent uropathologies in older men from 40 years of age. It has been shown, especially in patients with older age, to be a major cause of compromised quality of life. In this group of patients, complications such as renal failure, infectious situations, and traps associated with nocturia are common observed in addition to e lower urinary tract symptoms secondary to BPH.[1]

The European Association of Urology recommends surgical treatment for benign prostatic enlargement in patients with BPH, if medical treatment is ineffective or in situations with the presence of hematuria, urinary tract infection, bladder stones, renal failure, or chronic urinary retention related to BPH.[2] Despite of this recommendation, a group of patients is not suitable for surgical treatment due to high anesthesia risks linked to cardiac, respiratory, and neurologic problems. Therefore, researchers seek minimally invasive treatment options for these patients who do not have another alternative for being catheterized permanently.

The different methods of minimal invasive surgery including transurethral microwave therapy, transurethral needle ablation, convective radiofrequency (RF), water vapor

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thermal therapy (Rezum), and bipolar RF thermotherapy used in the treatment of patients with BPH (EAU Guideline). RF thermal energy technology produces heat energy applied within the prostatic tissue without carbonization or drying of tissue while preserving the prostatic urethra. [3] This energy triggers programmed cell death in prostatic tissue causing a reduction in prostatic tissue size, reducing, or treating prostatic symptoms. The aim of this study is to evaluate the efficacy of bipolar RF (BRF) thermotherapy which may be applied with local anesthesia among patients with permanent urethral catheter secondary BPH at high risk for invasive treatment.

MATERIALS and METHODS

The Local Ethics Committee provided approval for the study (IRB number: KAEK/2022.05.122). All patients participating in the study signed informed consent forms. This retrospective study included 13 male patients with permanent urethral catheter due chronic urinary retention secondary to BPH. These patients underwent transurethral BRF thermotherapy between May 2017 and September 2019. Because the patients is at high risk for invasive surgery under general anesthesia due the high comorbidity rate, catheter withdrawal after alpha-blocker treatment was attempted at least once before the operation, and those who were unable to urinate spontaneously were included in the study. Transabdominal ultrasonography was performed to measure the prostate volume, prostatic urethral length, and residual urine volume.

All patients were evaluated with digital rectal examination and prostate specific antigen, urine culture. Patients with acute urinary tract infection, positive urinary culture, prostate cancer, urethral stricture, neurogenic voiding dysfunction, prostate volume larger than 80 cm^3 or smaller than 20 cm^3, intravesical prostatic protrusion,[4] and bladder stones were excluded from the study. In addition, patients with a urethral length greater than 50 mm and <23 mm were not included in the study. The limitation of urethral length is important because the functional part of the applicator is between this this range. A special 16 Fr Foley applicator catheter with 6-ring electrode and feedback from the prostatic urethra from 3 heat sensors was used for computer-controlled RF energy (Fig. 1a). All patients had 48–53 C RF thermotherapy applied to transurethral prostatic tissue for a hour. They were followed for 3 days with a permanent urethral catheter. Those developing urinary retention were monitored with a permanent catheter for 1 week more. Those with unsuccessful procedure were monitored with monthly permanent urethral catheter.

RESULTS

A total of 13 patients were evaluated for success of treatment in eliminating the need for a permanent urinary catheter. The mean age of patients was 79.92±6.38 (67–90) years, mean prostate volume was 62.92±11.01 (43–80) ml, and the mean prostatic urethra length was 31.38±6.02 (23-40) mm (Fig. 1b and Table 1). The mean follow-up of patients was 10.69±4.04 (3–15) months.

All operations performed under local anesthesia and with analgesic support. No intraoperative systemic complications were recorded during the procedure. The mean op-

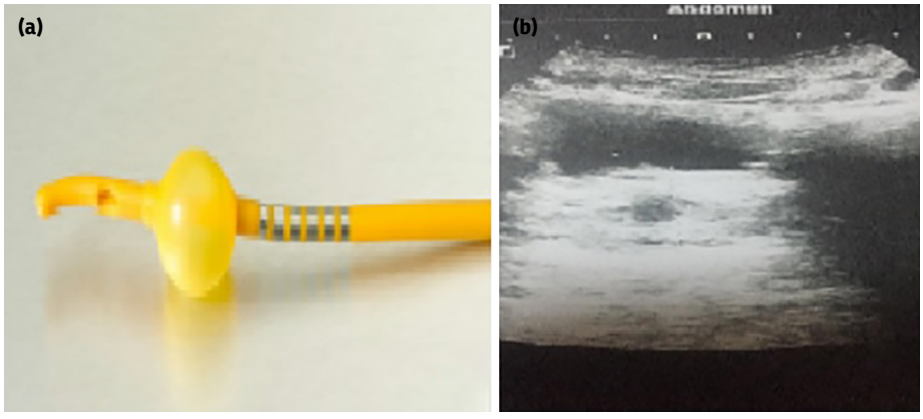

Figure 1. (a) Prostate volume and prostatic urethra length with transabdominal USG. **(b)** Special 16 fr Foley applicator catheter containing 6 ring electrode

USG: Ultrasonografi

Table 1. Demographic and clinical data

	N	Min	Max	Mean	SD
Age	13	67	90	79.92	6.383
Follow-up (Months)	13	3	15	10.69	4.049
PV	13	43	80	62.92	11.019
Length	13	23	40	31.38	6.021
Valid N (list wise)	13				

Min: Minimum; Max: Maximum; SD: Standard deviation

eration time was 80±2.35 min. Only one patient no longer required urinary catheter (0.76%). Two patients with unsuccessful treatment had transurethral resection of the prostate (TURP). One patient required blood transfusion due to severe hematuria 6 months after surgery. One patient who died could not complete the follow-up period. The other patients with unsuccessful BRF thermotherapy were monitored with permanent urethral catheter for refractory urinary retention.

DISCUSSION

Non-neurogenic urinary retention secondary to BPH is a health problem causing significant morbidity such as chronic renal failure, urinary system infection, and hydronephrosis.[5] Management of patients in this situation with high risk for surgical procedures includes the use of permanent urethral catheters. In this patient group, urinating without permanent urethral catheter is evaluated as successful treatment.[5]

In this study, the evaluation of the success in this patient group is urination without urethral catheter and acceptable postvoiding residue. However, only one patient could urinate spontaneously. The standard method for invasive treatment of BHP is TURP.[6] Although the effect of RF thermotherapy method for BPH treatment begins later after procedure, it is shown to be an alternative modality to pharmacologic treatment due to more permanent and lower side effect rates.[7] The patients with surgical risk and high ASA score is more appropriate for this procedure, because it can be performed under local anesthesia. Therefore, it may be shown to be an alternative to TURP for patients who are not suitable for more invasive treatment modalities.[7] In this study, there is not an alternative treatment for 13 patients who could not have anesthesia had a chronic catheter due to chronic urinary retention.

In the literature, countless studies have been presented about the success, efficacy, and cost of the most effective and standard invasive method of TURP. Studies comparing RF thermotherapy with TURP found that the treatment costs were 2489 dollars for RF thermotherapy and 4821 dollars for TURP.[8]

In the 6 month period after treatment, the chance of developing LUTS again was 0.3% for RF thermotherapy and 0.9% for TURP.[9,10] The rate of incontinence was 0.01% for RF thermotherapy and 2% with TUR.[8,11] The percentage erectile dysfunction was 0.01% with RF thermotherapy and 1% with TURP.[8,12,13] After treatment, stricture, contracture, or stenosis occurred in 0.01% of patients for RF thermotherapy and 4% for TURP.[8,11,14] Within 2 years, the rate of the development of acute urinary retention was 0.2% for RF thermotherapy and 1.7% for TURP.[8,11,13] The rate of urinary tract infection was 5% in RF thermotherapy and 12% in TURP.[8,11,13] A study investigating the presence of gross hematuria reported a rate of 8.8%. In this study, gross hematuria requiring transfusion developed in one patient 6 months later. Studies show that the efficacy of RF thermotherapy is lower compared to TURP, while it is better in terms of cost and side effects compared to TURP. From another aspect, application of RF thermotherapy in an office environment, discharge on the same day, and lack of hemorrhage problems are superior to TURP.

CONCLUSION

BRF thermotherapy is an alternative treatment modality for the patients that have been catheterized due to chronic urinary retention, because it can be performed under local anesthesia. However, the level of efficacy of this technique for patients with refractory urinary retention due to BPH should be evaluated with high number of cases.

Disclosures

Ethics Committee Approval: The study was approved by the University of Health Sciences, Kanuni Sultan Suleyman Training and Research Hospital Clinical Research Ethics Committee (No: 2022.05.122, Date: 11/05/2022).

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REFERENCES

1. Allen S, Aghajanyan I. Use of thermobalancing therapy in ageing male with benign prostatic hyperplasia with a focus on etiology and pathophysiology. Aging Male 2017;20:28–32. [CrossRef]
2. Vuichoud C, Loughlin KR. Benign prostatic hyperplasia: Epidemiology, economics and evaluation. Can J Urol 2015;22(Suppl 1):1–6.
3. Woo HH, Gonzalez RR. Perspective on the Rezūm® System: a minimally invasive treatment strategy for benign prostatic hyperplasia using convective radiofrequency water vapor thermal therapy. Med Devices (Auckl) 2017;10:71–80. [CrossRef]
4. Kadihasanoglu M, Aydin M, Taskiran M, Kendirci M. The effect of intravesical prostatic protrusion in patients with benign prostatic hyperplasia: Controlled, clinical study. Urol Int 2019;103:180–186. [CrossRef]
5. Stoffel JT, Peterson AC, Sandhu JS, Suskind AM, Wei JT, Lightner DJ. AUA white paper on nonneurogenic chronic urinary retention: Consensus definition, treatment algorithm, and outcome end points. J Urol 2017;198:153–160. [CrossRef]
6. Unnikrishnan R, Almassi N, Fareed K. Benign prostatic hyperplasia: Evaluation and medical management in primary care. Cleve Clin J Med 2017;84:53–64. [CrossRef]
7. Blute ML, Larson TR, Hanson KA, King BF. Current status of transurethral thermotherapy at the Mayo Clinic. Mayo Clin Proc 1998;73:597–602.
8. Ulchaker JC, Martinson MS. Cost-effectiveness analysis of six therapies for the treatment of lower urinary tract symptoms due to benign prostatic hyperplasia. Clinicoecon Outcomes Res 2017;10:29–43. [CrossRef]
9. Hindley RG, Mostafid AH, Brierly RD, Harrison NW, Thomas PJ, Fletcher MS. The 2-year symptomatic and urodynamic results of a prospective randomized trial of interstitial radiofrequency therapy vs transurethral resection of the prostate. BJU Int 2001;88:217–20. [CrossRef]
10. Al-Ansari A, Younes N, Sampige VP, Al-Rumaihi K, Ghafouri A, Gul T, et al. GreenLight HPS 120-W laser vaporization versus transurethral resection of the prostate for treatment of benign prostatic hyperplasia: a randomized clinical trial with midterm follow-up. Eur Urol 2010;58:349–55.
11. Bachmann A, Tubaro A, Barber N, d'Ancona F, Muir G, Witzsch U, et al. 180-W XPS GreenLight laser vaporisation versus transurethral resection of the prostate for the treatment of benign prostatic obstruction: 6-month safety and efficacy results of a European multicentre randomised trial--the GOLIATH study. Eur Urol 2014;65:931–42. [CrossRef]
12. McVary KT, Roehrborn CG. Three-year outcomes of the prospective, randomized controlled rezūm system study: Convective radiofrequency thermal therapy for treatment of lower urinary tract symptoms due to benign prostatic hyperplasia. Urology 2018;111:1–9. [CrossRef]
13. Sønksen J, Barber NJ, Speakman MJ, Berges R, Wetterauer U, Greene D, et al. Prospective, randomized, multinational study of prostatic urethral lift versus transurethral resection of the prostate: 12-month results from the BPH6 study. Eur Urol 2015;68:643–52. [CrossRef]
14. Thomas JA, Tubaro A, Barber N, d'Ancona F, Muir G, Witzsch U, et al. A multicenter randomized noninferiority trial comparing GreenLight-XPS laser vaporization of the prostate and transurethral resection of the prostate for the treatment of benign prostatic obstruction: Two-yr outcomes of the GOLIATH study. Eur Urol 2016;69:94–102. [CrossRef]