

The Effectiveness of Transurethral Bipolar Radiofrequency Prostate Thermotherapy in the Benign Prostat Hyperplasia

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Abstract

Benign prostatic hyperplasia (BPH) causes male lower urinary symptoms with aging. Due to inadequate medical treatment and some operational risks (using anticoagulant/antithrombotic therapy, high anesthesia risk/inoperable), alternative ablative techniques for BPH are applied in outpatient conditions, which have relatively few side effects, but whose results are similar to those of BPH's surgical treatment. Prostatic thermotherapy procedure is seen in the alternative ablative method for BPH's surgical procedure. TUMT, TUNA and WIT procedures are popular in the prostatic thermotherapy procedure. Recently, transurethral bipolar radiofrequency thermotherapy (TUBRT) procedure has also been used. The post-treatment effectiveness of these procedures is monitored by the assessment of IPSS, uroflowmetry and PVR parameters. In this article, we aim to present the effectiveness of the TUBRT procedure by examining the post-treatment parameters and comparing it with the post-treatment parameters of other prostatic thermotherapy procedures.

Keywords: Benign Prostatic Hyperplasia (BPH); Transurethral Bipolar Radiofrequency Thermotherapy (TUBRT); Male Lower Urinary Tract Complaints (mLUTS)

Introduction

Benign prostatic hyperplasia (BPH) is a significant pathological cause of male lower urinary tract complaints (mLUTS). Nocturia, strongüri, hesitancy are seen in 69% of men aged 60 - 69 and these complaints increase with aging [1]. Medical history, international prostate symptom score-quality of life (IPSS/QL), physical examination, urinalysis, prostat specific antigen (PSA), post voidal residual urine (PVR), uroflowmetry and ultrasound are used generally for BPH's diagnostic evaluation [2].

Medical treatments used for BPH symptoms are alpha-1 blockers, 5 alpha reductase inhibitors and phytotherapy agents. Unsuccessful medical treatment due to BPH and complications related to BPH (recurrent urinary infection, recurrent urinary retention, recurrent hematuria, renal failure, bladder stones) are the surgical indications of BPH [3].

It is important to know the patient's current diseases, the size of the prostate and the patient's expectations when planning surgical intervention for BPH. Surgical methods include monopolar/bipolar transurethral prostatectomy (m/b TURP), laser prostatectomy techniques, open prostatectomy, laparoscopic/robotic simple prostatectomy and minimally invasive methods (prostatic thermotherapy procedures, prostatic urethral lift). Among these, TURP is the most common method and its results are well known [2].

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Prostatic thermotherapy procedure is an alternative ablative method that has been known for many years and has been successfully applied to patients with non-neurogenic mLUTS related to BPH under local anesthesia by the outpatient conditions [4]. For this method, transurethral microwave therapy (TUMT), transurethral needle ablation (TUNA), water-induced thermotherapy (WIT), high intensity focused ultrasound (HIFU) and transurethral bipolar radiofrequency thermotherapy (TUBRT) are used. Prostatic thermotherapy procedures; It differs slightly in terms of heat source, heat distribution method, side effects, and the duration and number of treatment sessions. The main principle of the procedure is to relieve the pressure of the prostatic adenoma obstructing the prostatic urethra and to achieve symptomatic recovery [1].

Patients who had BPH surgery should be reviewed four to six weeks after catheter removal to assess the surgical response. Post-treatment parameters (IPSS, uroflowmetry and PVR volume) are used at follow-up visit after four to six weeks. The short or long term studies about BPH's surgical results showed their effectiveness with the post-treatment parameters [2]. In this review, we compare TUBRT's post-treatment parameters with the other popular prostatic thermotherapy procedures.

Technical information

Tempro system uses TUBRT. Tempro system has a device and an applicator. The device has a control panel (computer software) for the intraurethral temperature and time control. The applicator is alike as a 16 f urinary catheter. The distal part of applicator has metal rings for heating the prostate and measuring the prostate's temperature. The device produce the bipolar radiofrequency energy and applicator spreads bipolar radiofrequency energy in the prostatic urethra. These bipolar radiofrequency energy heat the prostate from the prostatic urethra to prostatic capsule. The heating degree starts from 36°C and reaches 55°C in 2 - 3 min. This treatment is applied at 53 - 55°C for 55 - 60 min in BPH. there is also no need for a neutralizing pad, cooler or rectal probe during TUBRT.

Contraindications

Patients with active urinary infections or pathogenic microorganisms grown in their urine culture can only be treated after the infection treatment is over. During transrectal ultrasonography (TRUS), TUBRT cannot be applied if the median lobe of the prostate is present or the length of the prostatic urethra measured is less than 23 mm or greater than 50 mm. If urinary catheterization of the applicator cannot be performed (urethral stricture), the procedure cannot be started. Patients with non-titanium coated metallic implants are also not recommended due to the risk of absorbing energy from the applicator. TUBRT cannot be also applied to patients with local or locally advanced prostate cancer, neurogenic bladder, bladder stones, penile prosthesis or artificial sphincter implants.

Application

Firstfully, TRUS is performed on the patient to check the length of the prostatic urethra and the presence of prostatic median lobe. Then, we apply urethral lidocaine gel with i.v tramadol for patient's pain control and 30 minutes later TUBRT is applied. When the procedure is over, the applicator is replaced with a 16 f urinary catheter. Oral antibiotic (ciprofloaccacin or sefuroksim axetil), NSAID and oral alpha blocker are recommended for medical treatment. Three days later, the patient is recalled for withdrawal of the urinary catheter. The patient's follow-up is done weekly, monthly and quarterly.

Side effects

During TUBRT, patients generally feel high temperature in the suprapubic or perineal region. Sometimes a burning sensation and rarely hematuria are observed, too. Hematuria, urinary retention due to edema, urgency and stronguri are observed after the application of procedure.

Discussion and Conclusion

Prostatic thermotherapy procedures (TUNA, TUMT, WIT) are used in the surgical indication of BPH patient who has 30 - 80g prostate. These alternative ablative techniques are used for patients who cannot stop using anticoagulants/anti-thrombocytic therapy, have high anesthesia risk, anxious about surgical interventions or cannot tolerate anesthesia [2,4].

The Rezum system uses WIT. In a multicenter, randomized, controlled study using the Resum system in 197 men, LUTS improved significantly within 3 months after WIT application and remained consistently at the same level for 2 years follow-up. IPSS improved by 47%, QL 43% and Qmax 50%. Re-treatment risk was found to be 4.4% for patients who completed the fourth year follow-up [5,6].

The TUMT protocol uses microwave energy. The application model is almost like Temprow System. High dose density protocol (HDD-TUMT) and PLFT (Prosta-Lund feedback therapy) are the most popular methods of TUMT [7,8]. Lucarelli, *et al.* used HDD-TUMT in a study, IPSS improved 68%, QoL 46%, Qmax 67% and PVR 73%. The mean follow-up period was 46 months, re-treatment rate was 34,8% at the end of mean follow-up period [9]. In a multicenter prospective study that started in 2007 and ended in 2012, 154 patients who underwent PLFT and TURP were followed. The improvement rates of IPSS, QoL score and Qmax parameters were observed at similar levels for both groups and there was no statistical difference between PLFT and TURP. Retreatment rates of PLFT and TURP groups were 10% and 4.3% [10]. In an another study, Aagard, *et al.* administered PLFT to BPH-related inoperable urinary catheter-dependent patients. Overall, 77% of patients were free from the urinary catheter and 79% reported an improvement in quality of life [11].

The TUNA protocol applies monopolar radiofrequency energy with the insertion of the transurethral needles into the prostate. Its duration is shorter than other methods. In a study by Law, *et al.* 128 patients were treated by TUNA protocol and followed up for five years. The improvement was found in IPSS 65%, QoL 75% and Qmax 35%. Re-treatment rate was 37.3% at the end of fifth year [12]. In another study, results of the 10-year follow-up of 351 patients treated with TUNA showed significant improvement in IPSS, QoL, and Qmax parameters, and the re-treatment rate was 3.6% at the end of the first year. It was increased to 26.4% at the end of the tenth year [13].

In a study with TUBRT, Ozbay, *et al.* [4] followed up 80 patients for two years. 41 patients were evaluated as high risk. The improvements were found in IPSS 72.1%, QoL 70.8%, PVR 51.1% and Qmax 44.8%. The improvements in post-treatment parameters were remained until the end of the 24th month. In two different studies with Temprow System, patients (n:180) were re-evaluated at the sixth month after TUBRT application. There were found significant improvements in the post-treatment parameters (IPSS, QoL, Qmax and PVR) [14,15]. Salar, *et al.* [16] applied TUBRT to BPH-related inoperable urinary catheter-dependent patients (n:62). 61% of patients were followed up for two years. 73% of patients were free from the urinary catheter in three months. It was also observed that the improved post-treatment parameters of 38 patients remained at the same level until the end of the second year. Finally, table 1 compares the TUBRT's clinical parameters with popular prostatic thermotherapy procedures.

	WIT	TUMT	TUNA	TUBRT
Procedure time	S	S	S	S
Catheterized days	G	B	G	G
Q max (ml/sn)	S	S	S	S
Side effect*	S	S	S	S
Sexual function**	G	G	G	G
Long term data	ID	S	S	ID
S: Same G: Good B: Bad ID:Inaduquate data				
*Macroscopic hematüri, coagulum retansi-on, eritrosit süspansiyon transfüzyon				
**Retrograd eejekülyon, erektil disfonksiyon				

Table 1: Comparison of prostatic thermotherapy procedures.

The improved post-treatment parameters of TUBRT are similar to the results of other prostatic thermotherapy procedures. The TUBRT procedure can be used safely in patients with lower urinary tract symptoms due to BPH or patients with high anesthesia risk or inoperable urinary catheter-dependent BPH.

Conflict of Interest

There is no conflict of interest.

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