

Transurethral Microwave Thermotherapy (TUMT) For Benign Prostatic Hyperplasia

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ABSTRACT:

BACKGROUND:

Benign prostatic hyperplasia (BPH) is one of the most common diseases of the aging male. Minimally invasive therapies for treatment of BPH compete with the gold standard transurethral resection of the prostate (TURP). The aim of this study is to assess the efficacy of transurethral microwave therapy (TUMT) in patients with otherwise poor general health.

METHODS:

Thirty (30) patients with associated chronic medical diseases and lower urinary tract symptoms due to BPH were subjected for TUMT as an outpatient single session procedure, from June 2001 to August 2005. Follow up was performed 2 weeks, and then one month following treatment clinically and by assessing residual urine volume, maximal flow rate and prostate size.

RESULTS:

Out of (28) treated patients, (21) were labeled as non – responders as they were unable to pass urine freely 2-weeks after a trial of decatheterisation. In contrast (7) patients passed urine freely after decatheterisation. In the latter group, it was found that there was no statistical significance of the values of maximum flow rate, residual urine volume or prostate size between pre- and one month post TUMT.

CONCLUSION:

TUMT is a possible option for the treatment of BPH in poor general health patients or those refusing other surgical modalities. However, it did not prove to be effective for those patients with chronic urinary retention and BPH.

KEY WORDS: Benign Prostatic Hyperplasia, Microwave thermotherapy.

INTRODUCTION:

Minimally invasive therapies for treatment of benign prostatic hyperplasia (BPH) compete with the gold standard transurethral resection of the prostate (TURP). Comparisons of efficacy and safety have broadened the knowledge of different treatment modalities ⁽¹⁾. Heat therapy for various prostatic diseases has gained interest since its introduction. Studies revealed the normal prostate cells underwent necrosis when exposed to temperatures of 44-45°C for 30 minutes ⁽²⁾. The aim of this study is to assess the efficacy of transurethral microwave therapy (TUMT) on residual urine volume, maximum flow rate and prostate size in patients with otherwise poor general health and BPH.

PATIENTS AND METHODS:

Thirty (30) patients were included in the study which was conducted in the Kadhimia Teaching Hospital / Nahrain College of medicine from June 2001 to August 2005. The patients were admitted for evaluation of lower urinary tract symptoms.

Prior to treatment with microwave thermotherapy, patients were clinically evaluated. None of them gave a history of previous TURP, bladder neck incision, or pelvic trauma.

Physical examination included digital rectal examination and neurological checking. The residual urine volume and prostate size were estimated as a baseline through transabdominal ultrasonography. Flexible urethroscopy under local anesthesia was performed. Urethral stricture was excluded. The urinary bladder was evaluated for evidence of tumors and stones. Technique The thermo therapy treatment was performed with a proscare® apparatus which has a device for intraprostatic temperature management by non invasive radiometric technique. The microwave thermometry system is made up of highly sensitive low noise receiver. The antenna used is filiform and fulfils both heating and measuring functions. The machine works with a frequency of 915 MHz via the urethral route and the maximum effects of the transmitter is 60 W. A Foley type catheter (18 French size) with a thermostatically controlled circulating water system of 20 degrees Celsius was used for the urethral route. The treatment was performed as an outpatient single session procedure for 60 minutes with an effect of (60) Watt. The temperature was raised during 5-10 minutes up to the decided plateau and then the treatment continued for 60 minutes. The calculated maximum intraprostatic temperatures were in the range of (43°C – 45°C). All patients had post

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session transurethral catheterization, using 16 French Foley's catheter. Follow up was performed 2 weeks after the treatment when a trial of decatheterization was attempted, and one month post TUMT when measurement of prostate size, residual urine volume, and maximum flow rate was performed by the same operator. **Statistics:** Chi – square and Fisher's exact tests were used for statistical analysis. P value < 0.05 was considered statistically significant.

RESULTS:

Thirty patients aged (55 – 72) years; with a mean age (62.5) years underwent TUMT. No clinical stigmata of neurological illness were detected. Pressure – flow urodynamic study was done and showed evidence of bladder outlet obstruction. Endoscopic evaluation neither showed prostate middle lobe hypertrophy or prominent median bar nor an evidence of bladder tumors or stones. Out of (30) patients, two (6.66%) had severe pain and the procedure was aborted within minutes following the beginning of thermotherapy. No patient in the treated group (28 patients) had frank hematuria or urethral bleeding up to one month following TUMT. Two patients (7.14%) developed acute

epididymorchitis following the TUMT session and were treated by antimicrobials according to urine cultures. The patients were grouped into two categories; responders and non- responders. The non responders are those who failed to pass urine freely after a trial of decatheterization two weeks after TUMT session. Out of the (28) treated patients, 21 (75%) fell in the non- responders group. Nineteen patients (90.47%) of the non- responders had already indwelling Foley's catheter for chronic urinary retention more than 3 months. The responders group includes (7) patients (25 %), who could pass urine two weeks post - TUMT session following decatheterization. From those seven patients, only two patients were followed up for 3 months post the TUMT session, while the remaining five patients were lost after one month to follow-up. Regarding statistical comparison in the responders group pre- and one month post-TUMT session, it was found that there was no significant effect on the values of maximum flow rate (p = 0.35), residual urine volume (p = 0.06) or prostate size (p = 0.57). Table (1) illustrates the criteria of the responder patients pre – and one month post TUMT session.

Table (1): The criteria for the responder patients prior to- and one month following- TUMT

	N1	N2	N3	N4	N5	N6	N7	Mean (± SD)
Prostate size (cm ³) pre - TUMT	40	47	90	37	46	31	38	47 ± 19.73
Prostate size (cm ³) post - TUMT	41	47	92	38	44	29	35	46.57 ± 20.88
Residual urine volume (cm ³) pre - TUMT	120	180	110	80	80	70	100	105.7 ± 37.35
Residual urine volume (cm ³) post - TUMT	110	160	110	75	70	70	100	99.28 ± 32.2
Maximum flow rate (ml/sec.) pre - TUMT	7	6	6	9	8	10	8	7.7 ± 1.49
Maximum flow rate (ml/sec.) post - TUMT	7	7	6	10	8	9	9	8 ± 1.41

DISCUSSION:

Considerations on the implementation of guidelines to clinical practice, emergence of new treatments, shift of benign prostatic obstruction therapy, economics and the increasing need to treat patients with different clinical profile during the last decade seem to affect the position of transurethral microwave thermotherapy in the armamentarium of a urological centre ⁽³⁾. Baert et al. could demonstrate a significant improvement in maximum flow rate in patients with bilobar hyperplasia after TUMT but the difference in residual urine volume was not statistically significant ⁽²⁾. Petrovich et al. suggests that the initial prostate volume is not an important parameter predicting response to TUMT ⁽⁴⁾. On the other hand, Nissen Korn et al. reports significantly better treatment results in patients with prostates smaller than 50 ml ⁽⁵⁾. Homma et al. found no significant correlation between the patient characteristics before treatment and the final

clinical results ⁽⁶⁾. It has been suggested that elevated PSA is a good indicator that an effective temperature is achieved during the treatment ⁽⁷⁾, since an increased PSA level might reflect damage of prostatic cells. In this study, patients were not selected on the basis of a pre – determined prostate volume, maximum flow rate, or residual urine volume. The majority of non – responding (19 out of 21) patients had a urinary catheter for chronic urinary retention suggesting a limited, if any therapeutic efficacy of TUMT among them. The group of responding patients, however, who were able to pass urine freely 2-weeks after decatheterisation, did not show a statistical difference regarding prostate size, residual urine volume, or maximum flow rate pre- and one month post TUMT. Whether such statistical difference can be documented with further follow - up or it can be achieved with certain selection criteria for patients with BPH, it remains to be evaluated.

Unfortunately the non compliance of patients and their relatives with a longer follow up dictated limited conclusions. Further studies with a larger sample of patients, extended follow up, and comparison of peri- and postoperative complications of TUMT with the gold standard transurethral resection of prostate (TURP) and/or other minimally invasive modalities, are required to assess the efficacy of TUMT which had been used only in the last few years in Iraq. The results of microwave treatment in the acute post procedure period can be significantly improved either by neoadjuvant and adjuvant α -blockade or by placement of an intraurethral prostatic bridge catheter⁽⁸⁾. Others reported improved outcome of TUMT for the treatment of BPH if it is followed by dilatation with double-balloon catheter⁽⁹⁾. Using the low-energy Prostatron Prostasoft 2.0, Ohigashi et al.⁽¹⁰⁾ reported an estimated of 67% retreatment rate with 5 years with only 11% "satisfied" with treatment, while Tsai et al.⁽¹¹⁾ reported an overall retreatment rate of 84.4% in 5 years using Prostate. In both of these studies, patients with high peak flow rates (i.e. > 6.5 cc/sec) and short urethral lengths (i.e. < 40 mm) had a lower risk of receiving additional treatments after TUMT. Interestingly, in both studies, older patients (i.e. > 64 years old) similarly had a decreased rate of retreatment. Keijzers et al.⁽¹²⁾ similarly reported a decreased risk of retreatment in patients with pre-treatment maximal urinary flow greater than 10 cc/sec, Madsen symptom score less than 15, post-void residual urine less than 100 cc, and age greater than 65 years. In comparison, higher energy protocols appear to result in symptomatic improvement similar to that of lower energy protocols yet the improvement in uroflowmetry is much more pronounced. This appears to be in trade-off for greater irritative symptomatology and longer duration of catheterization⁽¹³⁾.

CONCLUSION:

TUMT is a possible option for the treatment of BPH in poor general health patients or those refusing other surgical modalities. However, it did not prove to be clinically effective for those patients with chronic urinary retention and BPH.

REFERENCES:

1. Herrmann TR, Gross AJ, Schultheiss D, Kaufmann PM, Jonas U, Burchardt M. Transurethral microwave thermotherapy for the treatment of BPH: still a challenger? *World J Urol.* 2006 24;389-96.
2. Baert L, Ameye F, Astrahan M, Petrovich. Transurethral microwave hyperthermia for benign prostatic hyperplasia: The Leuren clinical experience. *J Endourol*1993; 7: 61 – 69.
3. Gravas S, Melekos MD. Transurethral microwave thermotherapy: from evidence-based medicine to clinical practice. *Curr Opin Urol.* 2007; 17,12-6.
4. Petrovich Z, Ameye F, Pike M, Boyd S, Baert L. Relationship of response to transurethral hyperthermia and prostate volume in BPH patients. *Urology*1992; 40: 317 - 321.
5. Nissen Korn I, Rotbard M, Slutzker D, Bernheim J. Connection between the length of the heating antenna and volume of the prostate in transurethral thermotherapy for benign prostatic hyperplasia. *Eur Urol* 1993; 23: 307 - 311.
6. Homma Y, Aso Y. Transurethral microwave thermotherapy for benign prostatic hyperplasia: A 2- year follow up study. *J Endourol* 1993; 7: 261 - 265.
7. Debruyne FMJ, Bloem FAG, de la Rosette JJMCH, Laduc R. Transurethral thermotherapy (TUMT) in benign prostatic hyperplasia: placebo versus TUMT (abstract 146). *Proced. American Urological Association Annual Meeting, May, San Antonio, Texas.* *J Urol* 1993; 149, 250 A.
8. Bob Djavan and Michael Marberger. Minimally Invasive Procedures and Medical Management—Their Relative Merits in Treating Lower Urinary Tract Symptoms of Benign Prostatic Hyperplasia. *Rev Urol.* 2000 ; 2,105–114.
9. Tsukada O, Murakami M, Kosuge T, Yokoyama H. Treatment of benign prostatic hyperplasia using transurethral microwave thermotherapy and dilatation with double-balloon catheter. *J Endourol.* 2005; 19 :1016-20.
10. Ohigashi T, Babsa S, Ohki T, Nakashima J, Murai M: Long-term effects of transurethral microwave thermotherapy. *Int J Urol.* 2002; 9: 141-5.
11. Tsai YS, Lin JS, Tong YC, Tzai TS, Yang WH, Chang CC, et al.: Transurethral microwave thermotherapy for symptomatic benign prostatic hyperplasia: long-term durability with Prostate. *Eur Urol.* 2001; 39: 688-92.
12. Keijzers GH, Francisca EA, d’Ancona FC, Kiemeny LA, Debruyne FM, de la Rosette JJ: Long-term results of lower energy transurethral microwave thermotherapy. *J Urol.* 1998 ; 159: 1966-72.
13. de la Rosette JJ, Francisca EA, Kortmann BB: Clinical efficacy of a new 30-min algorithm for transurethral microwave thermotherapy: initial results. *BJU Int.* 2000; 86: 47-51.