

# The impact of transurethral microwave thermotherapy on erectile function and lower urinary tract symptoms in men with benign prostatic hyperplasia – short communication

Roger Ziętek<sup>1</sup>, Stanisław Czeszak<sup>1</sup>, Zbigniew Ziętek<sup>1,2, A</sup> 

<sup>1</sup>109. Military Hospital in Szczecin, Department of Urology, Piotra Skargi 9, 71-422 Szczecin, Poland

<sup>2</sup>Pomeranian Medical University in Szczecin, Department of Functional and Clinical Anatomy, Ku Słońcu 12, 71-073 Szczecin, Poland

<sup>A</sup>ORCID: 0000-0003-4049-7851

 zzietek@poczta.onet.pl

## ABSTRACT

**Introduction:** Although microwave thermotherapy is becoming an almost forgotten therapy, occasional reports confirm that transurethral microwave thermotherapy (TUMT) still seems to be a good alternative for benign prostate hyperplasia (BPH). The aim of this study was to re-evaluate the advantages and disadvantages of TUMT.

**Materials and methods:** The non-randomized study included 4590 patients with BPH. All patients were on pharmacological treatment. Prior to the study, patients underwent digital rectal examination (DRE), ultrasound examination, urodynamic examination, and prostatic specific antigen (PSA) concentration. Exclusion criteria included suspected prostate cancer on DRE, an ambiguous result of the urodynamic examination, suggesting a neurological component in lower urinary tract symptoms (LUTS), and elevated PSA concentration. In the end, 3329 patients were enrolled for further analysis. Of this group 2159 patients elected to receive TUMT. The others decided to continue their pharmacotherapy. Two questionnaires were used to evaluate the effect of TUMT on the

relief of urinary symptoms and erectile dysfunction (ED). The International Prostate Symptom Score (IPSS) was used for LUTS and the International Index of Erectile Function-5 (IIEF-5) for ED. **Results:** After 6 months from thermotherapy, more than 50% of patients experienced an improvement in their urination ( $p < 0.0018$ ), while in the pharmacological group only 30% did ( $p < 0.031$ ). Approximately 28% of all patients regained erection. Before thermotherapy, only 12% reported no erection problems. In contrast, a further deterioration of erectile function (EF) was observed in the reference group (differences with TUMT at  $p < 0.0001$ ). Apart from transient fever or temporary urinary retention, no serious complications were observed.

**Conclusions:** It appears that TUMT is still a valuable option for BPH, especially in outpatient practice and for those patients who wish to protect their EF.

**Keywords:** thermotherapy; conservative treatment; erectile dysfunction; lower urinary tract symptoms; complication; benign prostatic hyperplasia (BPH).

## INTRODUCTION

Since the last decade of the new millennium, the number of transurethral microwave thermotherapy (TUMT) treatments has decreased significantly [1, 2, 3, 4]. A review of the literature shows that many reports have disputed TUMT as a valuable treatment for benign prostatic hyperplasia (BPH), but a detailed analysis of these data clearly shows that TUMT was almost as effective as TransUrethral resection of prostate (TURP) in some aspects [1]. Current treatment of lower urinary tract symptoms (LUTS) due to BPH still includes TURP as the gold standard [2]. However, significant morbidity and serious complications are slowly shifting it down in the best treatment options panel for BPH, especially for very selected patients who were burdened with many diseases [2, 5]. For these reasons, other less invasive techniques such as TUMT or Rezum have been advocated [6, 7]. Currently, in the Scandinavian countries, TUMT is regaining its former position and is being reused in urological practice [3].

The main purpose of this short communication was to reassess the effectiveness of TUMT in terms of both favorable and unfavorable phenomena in BPH treatment.

## MATERIALS AND METHODS

The retrospective analysis included a group of 4590 outpatients with BPH. Prior to enrollment, these patients were treated either conservatively, including  $\alpha$ -receptor blocker and 5- $\alpha$  reductase inhibitor, or surgically, excluding TUMT. Only patients without surgery were selected for further analysis. The study period covered the years 2016–2021. The inclusion criterion for the study was symptomatic BPH confirmed by urodynamic examination, transrectal ultrasound examination (TRUS), prostatic specific antigen (PSA) concentration, and digital rectal evaluation (DRE). Two thousand fifty-nine patients signed their voluntary consent form for the TUMT, while the rest who opted for pharmacotherapy did not have to do so. No patient, either on TUMT or pharmacological regime, was forced into our project. There was no medical indication. Some patients on medical regimen with good results for their urinary or erectile function (EF) decided to continue medical treatment. All patients were treated on an outpatient basis. The age of the patients ranged 54–87 years with a mean of  $74 \pm 18$  years. In both groups, many patients suffered from various diseases such as diabetes or arterial hypertension.

Each patient was instructed to discontinue pharmacological treatment after TUMT. Some of them did not comply and these patients were also excluded from further analysis. Finally, 1460 patients were selected from the TUMT group. The reference group included 1170 patients in the pharmacological regime. Pharmacotherapy included  $\alpha$ -receptor blockers and 5- $\alpha$  reductase inhibitors. At baseline, each enrolled patient from both groups was asked to complete 2 questionnaires: International Prostate Symptom Score (IPSS) and International Index of Erectile Function-5 (IIEF-5). After 6 months of observation, each patient in both groups had to complete both questionnaires again. At the third month of the follow-up, PSA was reassessed.

The symptom scale expressed by the IPSS was as follows – mild, moderate, and severe symptoms.

The symptoms of erectile dysfunction (ED) expressed by the IIEF-5 scores were as follows – no ED, mild, mild to moderate, moderate, and severe symptoms.

### Statistical methods

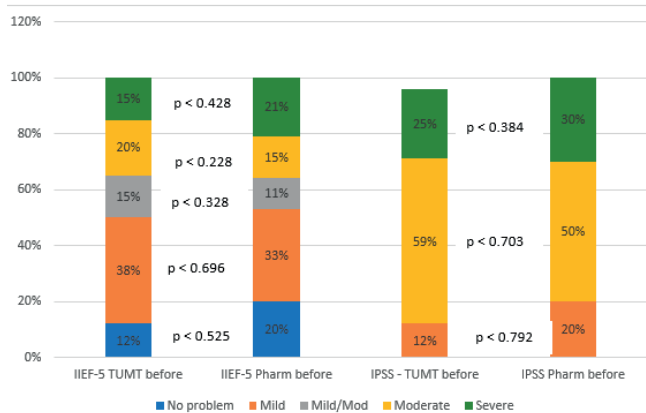
All statistical analyses were performed using Statistica Soft Pol, version 13. The normality distribution of the studied parameters was tested using the Shapiro–Wilk test. Arithmetic mean (X) and standard deviation (SD) were calculated.

The hypothesis of the effect of TUMT on LUTS and EF was tested by the Z test for 2 independent proportions. The confidence interval (CI) was calculated according to Clopper–Pearson. For all tests,  $p < 0.05$  was considered statistically significant.

The study was approved by the Institutional Review Board (Ethics) – protocol number WLS-1/2019.

## RESULTS

As can be seen in Figure 1, both groups were similar before the study according to the distribution of the examined questionnaires. The baseline parameters in both groups of patients in the IPSS and IIEF-5 scoring systems did not differ significantly.

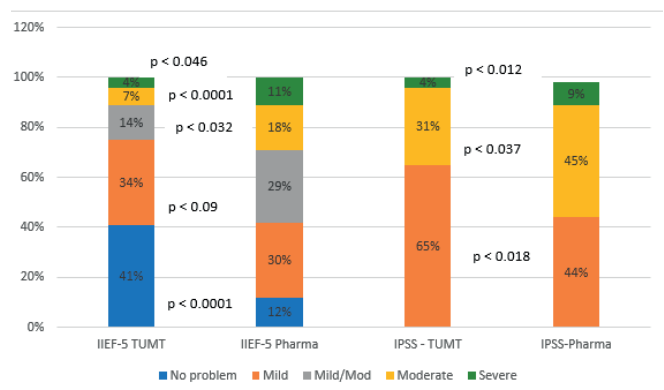


p – statistical significance according to the Z test; TUMT – transurethral microwave thermotherapy; IIEF-5 – International Index of Erectile Function-5; IPSS – International Prostate Symptom Score

**FIGURE 1.** Comparison of the International Index of Erectile Function-5 and the International Prostate Symptom Score questionnaires before the study

Figure 2 shows the results of the IIEF-5 and IPSS questionnaires in the study groups. After 6 months, the baseline scores (Fig. 1) were compared with the final scores (Fig. 2). Based on the IIEF-5 questionnaire, there was a significant improvement in erection at 6 months in patients treated with TUMT. The number of patients reporting an improvement in erection increased by 12–41%.

At the same time, however, ED continued to worsen in the reference group. Before the study, 20% of patients in the reference group reported no erection problems, but after 6 months of continued pharmacological treatment, only 12% could maintain their erection at the same level as before. Overall, post-TUMT patients experienced an improvement in EF. In the reference group, on the other hand, the trend was towards further deterioration of their erections.



p – statistical significance according to the test Z; TUMT – transurethral microwave thermotherapy; IIEF-5 – International Index of Erectile Function-5; IPSS – International Prostate Symptom Score

**FIGURE 2.** Comparison of the International Index of Erectile Function-5 and the International Prostate Symptom Score questionnaires after 6 months of therapy between the 2 groups

Greater improvement in LUTS, as measured by the IPSS questionnaire, was observed in the TUMT group, compared to the reference group. After 6 months, many patients who underwent TUMT experienced an improvement in urinary symptoms. This was reflected in a reduction in the number of patients with severe urinary dysfunction (15% before vs. 4% after,  $p < 0.025$ ). These symptoms were classified as mild, thus increasing this group to 65% (before 12%). In the reference group, this increase was much smaller, approx. 44% ( $p < 0.018$ ). Following TUMT, 10% of patients experienced transient urinary retention, 15% transient fever, 5% episodic hematuria, and 3% alternative urological procedures. None of the patients developed major complications such as urosepsis or bleeding requiring blood transfusions.

## DISCUSSION

A review of the literature, especially from the last decade of this millennium, shows a significant decrease in the number of publications on TUMT [1, 4]. We as well as the authors of

Madersbacher et al. [2] and Abrams [8], showed a significant improvement in IPSS results after TUMT. It is worth noting that no serious complications were observed. The analysis of sexual function after treatment of BPH is definitely more positive for TUMT [8]. Other authors found an improvement in objective urodynamic parameters and clearly demonstrated advantages over sham therapy [1, 5, 6, 7].

Abrams showed in a 6-month follow-up that almost 77% of patients were able to deflate without a catheter and more than 79% reported an improvement in quality of life. They concluded that TUMT is a good alternative for patients with contraindications to TURP [8].

The overall conclusion from all these reports is that TUMT provides a similar reduction in LUTS as TURP, but definitely with a lower risk of adverse events [1, 9, 10].

The analysis of sexual function after TUMT is definitely more positive compared to other options, including TURP or pharmacological options [4, 8, 9, 10].

## CONCLUSIONS

According to our results, TUMT seems to be a safe and relatively effective treatment for LUTS. It may be a good alternative for the treatment of BPH, especially for patients at increased risk. For proper evaluation of TUMT, long-term observations and the development of precise criteria for its application are needed. Furthermore, further development is necessary to promote the idea of outpatient procedures in the treatment of BPH.

## REFERENCES

1. Hoffman RM, Monga M, Elliott SP, Macdonald R, Langsjoen J, Tackling J, et al. Microwave thermotherapy for benign prostatic hyperplasia. *Cochrane Database Syst Rev* 2012;9:CD004135.
2. Madersbacher S, Alivizatos G, Nordling J, Sanz CR, Emberton M, de la Rosette JJ. EAU 2004 guidelines on assessment, therapy and follow-up of men with lower urinary tract symptoms suggestive of benign prostatic obstruction (BPH guidelines). *Eur Urol* 2004;46(5):547-54.
3. Franco JV, Garegnani L, Escobar Liquitay CM, Borofsky M, Dahm P. Transurethral microwave thermotherapy for the treatment of lower urinary tract symptoms in men with benign prostatic hyperplasia. *Cochrane Database Syst Rev* 2021;6(6):CD004135. doi: 10.1002/14651858.CD004135.pub4.
4. Gravas S, Cornu JN, Gacci M, Gratzke C, Herrmann TRW, Mamoulakis C, et al. Management of non-neurogenic male lower urinary tract symptoms (LUTS), incl. benign prostatic obstruction (BPO). Helsinki: European Association of Urology; 2019.
5. Nørby B, Nielsen HV, Frimodt-Møller PC. Transurethral interstitial laser coagulation of the prostate and transurethral microwave thermotherapy vs transurethral resection or incision of the prostate: results of a randomized, controlled study in patients with symptomatic benign prostatic hyperplasia. *BJU Int* 2002;90(9):853-62.
6. Yu X, Elliott SP, Wilt TJ, McBean AM. Practice patterns in benign prostatic hyperplasia surgical therapy: the dramatic increase in minimally invasive technologies. *J Urol* 2008;180(1):241-5.
7. Dixon C, Rijo Cedano E, Pacik D, Vit V, Varga G, Mynderse L, et al. Transurethral water vapor therapy for BPH; initial clinical results of the first in man trial and Rezūm™ I pilot study. *Eur Urol Suppl* 2013;12(1):e631.
8. Abrams P. Surgical management of lower urinary tract symptoms attributed to benign prostatic hyperplasia: AUA Guideline Amendment 2020. *Letter. J Urol* 2021;205(3):938. doi: 10.1097/JU.0000000000001558.
9. Lerner LB, McVary KT, Barry MJ, Bixler BR, Dahm P, Das AK, et al. Management of lower urinary tract symptoms attributed to benign prostatic hyperplasia: AUA Guideline Part I – Initial work-up and medical management. *J Urol* 2021;206(4):806-17. doi: 10.1097/JU.0000000000002183.
10. Lerner LB, McVary KT, Barry MJ, Bixler BR, Dahm P, Das AK, et al. Management of lower urinary tract symptoms attributed to benign prostatic hyperplasia: AUA Guideline Part II – Surgical evaluation and treatment. *J Urol* 2021;206(4):818-26. doi: 10.1097/JU.0000000000002184.