

Influence of urethral mucosa preservation of prostatic apex during monopolar transurethral resection of the prostate on postoperative functional outcomes

A retrospective comparative study

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Abstract

Purpose: The aim of this study is to compare the efficacy and functional outcomes of monopolar transurethral resection of the prostate (m-TURP) without and with the preservation of urethral mucosa at the prostatic apex.

Materials and methods: In a retrospective study from June 2018 to June 2020, 53 patients with benign prostatic hyperplasia who undertook m-TURP were included in the study. The patients who underwent conventional m-TURP were considered group A (n = 26) and those who were operated by m-TURP with preserved prostate apex were considered group B (n = 27). Preoperative and operative parameters, postoperative complications, urinary incontinence (UI), postoperative 6-month functional outcomes including International Prostate Symptom Score, International Index of Erectile Function score, and peak flow rates (Q max) were assessed and compared between groups.

Results: All preoperative parameters were similar in both groups without significant differences ($P > 0.05$). In group A, the mean operative time was significantly longer (40.59 ± 5.20 versus 33.84 ± 4.44 minutes), and intraoperative blood loss was significantly more (305 ± 63.4 versus 212.5 ± 65 mL) than in group B and both were statistically significant ($P < 0.001$ and $P < 0.0001$, respectively). Group B had significantly lower urge UI compared with group A (0% versus 23%; $P = 0.008$). Six-month follow-up data showed that the International Prostate Symptom Score, International Index of Erectile Function score, and Q max were improved in both groups with no statistically significant differences between the 2 groups ($P > 0.05$).

Conclusion: Our results indicate that preservation of urethral mucosa at the prostatic apex can be associated with a lower incidence of early postoperative urge UI, less operative blood loss, and shorter operative length, thus improving surgical efficiency.

Keywords: benign prostatic hyperplasia, prostatic apex, transurethral resection of prostate, urinary incontinence

1. Introduction

Lower urinary tract symptoms in elderly men are prevalent and are caused by benign prostatic hyperplasia (BPH)¹. BPH

incidence accounts for up to 50% of men aged 50 to 60 years and significantly rises with increasing age². Surgical BPH management is recommended for patients unresponsive to medical therapies, with complicated lower urinary tract symptoms, and unwilling to medical treatments³. Transurethral resection of the prostate (TURP) has been recognized for decades as the standard and reference procedure for treating BPH with a prostate volume of <80 mL⁴. Postoperative early urge urinary incontinence (UI) is one of the most common complications of TURP⁵. Resectioning the urethral mucosa of the prostate apex is one of the challenging steps in TURP surgery. Few studies revealed the association of preserved urethral mucosa at the prostatic apex with a lower occurrence of postoperative urge UI^{5,6}. However, the efficacy of these methods remains unclear, because they may be associated with a high regrowth rate, which subsequently increases the need for second procedures⁷. The present study aimed to retrospectively compare the efficacy between the preserved urethral mucosa at the prostate apex during monopolar TURP (m-TURP) and the conventional method in our institute.

2. Materials and methods

2.1. Study design

The Institutional Ethics Committee of Shiraz University of Medical Sciences approved our study protocol and all

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The datasets generated during and/or analyzed during the current study are available from the corresponding author on reasonable request.

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and shortened surgical time. In addition, the indexes of the 2 groups were comparable (IPSS, Q max, and IIEF-5) 6 months postoperatively, indicating comparable short-term clinical efficacy among the different surgical methods. Several surgical modalities for treating BPH exist, and m-TURP remains the gold standard treatment option¹¹. However, complications in this procedure, such as postoperative UI, remain high¹². Early UI can occur in up to 30% to 40% of patients and is usually presented as urge UI and is associated with urinary tract infection. This type of UI occurs during fossa healing due to detrusor instability or due to long-lasting BPH, whereas late iatrogenic stress UI occurs in <0.5% of patients due to external urethral sphincter injuries^{13,14}. Our study revealed urge UI in 6 (23%) patients after catheter removal in the conventional m-TURP group. Of them, 4 were healed within 1 week and 2 within 3 months. This UI rate decreased over time, which is consistent with previously published studies^{5,6}. The urge UI zero rate in patients who underwent m-TURP with prostate apex preservation may be due to less prostate damage or less detrusor instability in such patients. Case selection might be the key to highly successful outcomes and satisfaction rates in our study. Only those patients who met our criteria underwent surgery. Less strict exclusion criteria might cause poorer outcomes, which should be investigated in future studies.

Several factors with the controversy between the reported studies have increased the risk of UI after BPH surgery. Of them, advanced age, higher body mass index (>30), higher preoperative IPSS, uncontrolled diabetes, longer operative time (>100 minutes), increased surgical enucleation weight, and intraoperative blood loss (>2.5 g/dL) can be mentioned^{15,16}. Other reported factors include urethral membrane length, higher detrusor voiding pressure, and abnormal baseline urodynamic parameters¹⁷. Our study controlled most of these preoperative factors by a specific selection of enrolled patients with exact inclusion criteria to avoid any bias in our result.

The surgical steps of m-TURP are illustrated elsewhere in the literature. Prostate apex resection or preservation is a critical step in the m-TURP procedure⁷. Incautious apex resection might cause capsular perforation or postoperative UI due to its proximity to the external urethral sphincter and thin wall¹⁸. The urethral mucosa at the prostatic apex was well preserved in our study, similar to an open prostatectomy. Urethral mucosa apex preservation of the prostate has several advantages, such as preventing intraoperative external urethral sphincter injuries, acting as a sealing pad, and improving the efficiency of prostatectomy, compared with conventional m-TURP⁶. In contrast, preserving the apex region may be associated with a high regrowth rate due to incomplete resection, which subsequently increases the need for second procedures⁷. Previous studies reported approximately 10% to 12% of possible secondary m-TURP in 5 years. However, a consequence of bladder neck stenosis or stricture, and not residual obstructive prostate tissue, caused retreatment in most cases^{19,20}. Our study just included a small sample size with a short follow-up time, thus a larger sample size with a longer follow-up time is required to validate these findings.

TURP procedure times ranged from 33 to 81 minutes on average¹³. This discrepancy could be related to a variety of operator-dependent technical features and skills. Our study expected a longer operative time in group A due to more tissue resection time. Bleeding is one of the significant intraoperative complications. Whereas in the early series, the incidence rates of intraoperative bleeding during M-TURP requiring blood transfusion were reported of up to 22%, the incidence has decreased to 0.4% to 7.1% in our study^{21,22}. Our study revealed greater intraoperative bleeding in group A than in group B, with a statistically significant difference (305 ± 63.4 versus 212.5 ± 65 , $P < 0.0001$), similar to previous reports^{5,6}. These reports reported a similar method of urethral mucosa preservation of the prostatic apex during endourologic prostate resections of BPH with a shorter operative time, less intraoperative bleeding, and low postoperative urge UI incidence, as mentioned by Liang et al and Liu and Yang^{5,6}.

The postoperative blood transfusion rate was observed in 1 and 3 cases in groups B and A, respectively. Mebust et al²¹ illustrate that overresection in any prostate area might expose venous sinuses and cause bleeding. Consequently, the urologist should be careful during apex resection due to its thin wall to avoid venous sinus opening and bleeding. Previous studies reported capsular perforation as an m-TURP complication²³. We observed no prostate capsular perforation, TUR syndrome, urethral stricture, or hematuria in both groups. Expectedly, we had no capsule perforation and lower rates of complications in comparison to other research because all surgeries in our study were conducted by a single academic urologist with several years of experience in this field.

Previous studies reported a significant improvement in IPSS and Q max with or without apical prostate resections^{5,6}. Similarly, our study revealed IPSS and Q max improvement in both groups without statistically significant differences during the 6-month follow-up period. However, the long-term efficacy of this procedure remains unknown, which requires further studies with more extended assessment periods to follow this outcome method. Notably, the follow-up period in Liu and Yang⁵ was 1 month, including IPSS and urge UI occurrence, while our study extended the follow-up to 6 months. In addition, we evaluated the IIEF-5 score.

Erectile dysfunction has been indicated as one of the m-TURP complications due to penile cavernosal nerve damage through heat and cutting current. The cavernosal nerves of the penis pass through the lateral prostate along its path and are closest to the apex of the prostate, and from there, they enter the cavernous bodies of the penis, thus heat damage in these areas causes erectile dysfunction²⁴. Our study revealed no statistically significant difference in the evaluation of erectile function based on the IIEF-5 between the 2 groups ($P = 0.34$). However, group B demonstrated more improvements (14.50 ± 3.74 versus 15.67 ± 4.42).

The current study had some limitations. First, large prostates of ≥ 80 cc were excluded from the study. Second, preserving the apex of the procedural outcome may be time dependent; thus we indicate further studies with larger samples and better randomization. Third, the postsurgical UI assessment has insufficient data compared with the baseline and different variants in the shape of the prostatic apex²⁵. Fourth, this study includes a small number of cases. We indicate further studies with a larger sample size and better randomization. Finally, the study was conducted in a single center.

5. Conclusion

Our result indicated the association of the preserved urethral mucosa of the prostate apex with a lower incidence of postoperative urge UI, intraoperative blood loss, and shorter operative length, thereby improving surgical efficiency.

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References

1. Rohrmann S, Katzke V, Kaaks R. Prevalence and progression of lower urinary tract symptoms in an aging population. *Urology*. 2016;95:158–163.
2. Chute CG, Panser LA, Girman CJ, et al. The prevalence of prostatism: a population-based survey of urinary symptoms. *J Urol*. 1993;150:85–89.
3. Oelke M, Bachmann A, Descalcaud A, et al; European Association of Urology. EAU guidelines on the treatment and follow-up of non-neurogenic male lower urinary tract symptoms including benign prostatic obstruction. *Eur Urol*. 2013;64:118–140.