Original Article

Cent Asian J Med Sci. 2017 Feb;3(1): 62-65.

Central Asian Journal of Medical Sciences
CAJMS

Holmium Laser Enucleation Versus Transurethral Resection in Patients with Benign Prostatic Hyperplasia

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Submitted: November 15, 2016
Revised: January 11, 2017
Accepted: January 23, 2017

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Objectives: To evaluate efficacy and safety of the holmium laser enucleation of the prostate (HoLEP) compared to transurethral resection of the prostate (TURP) for treatment of benign prostatic hyperplasia. **Methods:** A total of 62 patients with benign prostatic hyperplasia were included in the study. 42 patients in the TURP group and 18 in the HoLEP group were surgically operated. Preoperative assessments included; international prostate symptom score (IPSS), urinary peak flow rate, prostate volume and serum PSA. Perioperative parameters included; operating time, catheterization time, bladder irrigation, resected tissue weight, perioperative complications, blood transfusion and duration of hospital stays. **Results:** HoLEP had a statistically longer operating time ($p<0.008$) with fewer perioperative complications ($p<0.0001$) and shorter irrigation time ($p=0.0001$) than TURP. Moreover, significantly more prostatic tissue was removed by HoLEP ($p<0.0001$) than TURP. There were no statistical differences in catheterization time, blood transfusion and duration of hospital stay days. **Conclusion:** HoLEP is a safe and effective procedure for surgical treatment of prostatic benign hyperplasia.

Key words: Prostatic Hyperplasia, HoLEP, TURP.

Introduction

Transurethral resection of the prostate (TURP) has been the gold standard for surgical treatment of bladder outflow obstruction due to benign prostatic hyperplasia (BPH). It comprises 95% of all surgical procedures in Europe and North America [1]. TURP is considered to be efficient, cost-effective with low complications and re-treatment rates [2-5].

Nonetheless, TURP is connected with relatively high morbidity, due to high blood loss (a blood transfusion rate from

5% to 11%). The same issues apply to TUR syndrome while treating larger prostates [6-7]. Peter Gilling and colleagues first described Holmium laser enucleation of the prostate (HoLEP) as an alternate technique for enucleation of the prostate in 1996 [8]. HoLEP is considered to be an ideal combination of cutting and coagulation when treating any prostate size with minimal risk of TUR syndrome and low transfusion rates [8-9]. Moreover, HoLEP requires less catheter time and hospital stays in addition to increased removal of tissue compared to TURP and open prostatectomy [10-12]. Although HoLEP is thought to be a feasible treatment for BPH it still has a learning curve. Thus, we performed this study to provide more evidence of efficacy and safety of HoLEP as compared to TURP for treatment of benign prostatic hyperplasia.

Materials and Methods

After obtaining ethical approval, 62 patients were presented to the Urology Department at the affiliated Hospital of Inner Mongolia University for the Nationalities between 2015 and 2016. These patients had symptomatic prostatic hyperplasia and a prostate volume greater than 30g (determined by ultrasonography). Each patient who had not responded to pharmacological therapy and deemed eligible for surgical treatment were enrolled in this randomized, prospective study. Other inclusion criteria were: 1) an International Prostate Symptom Score (IPSS) of 12 or higher; 2) peak urinary flow rate under 15ml/s and; 3) total serum Prostate Specific Antigen (PSA)<4 ng/mL. Exclusion criteria were: 1) neurogenic bladder; 2) prostatic malignant disorder; 3) previous urethral; 4), bladder neck or; 5) prostatic surgery.

We collected patient information such as; age, IPSS, urinary peak flow rate, prostate volume and serum PSA. Clinical data, including operating time, catheterization time, bladder irrigation, resected tissue weight, perioperative complications, blood transfusion, and duration of hospital stays were recorded. All patients provided written informed consent. Patients were surgically operated in the lithotomy position under regional anesthesia. The HoLEP technique was performed as previously described by Gilling et al [8]. The TURP technique was performed according to the standard method.

Table 1. Baseline patient characteristics

	Mean ± SD HoLEP (range)	Mean ± SD TURP (range)	p-value
Age (range)	72±7.3	71±8.3	0.581
IPSS	22±1.8	25±3.7	0.035
QoL Score	5	4	0.268
Qmax (ml/s)	8	7.1	0.389
Prostate volume (ml)	76±24	99±38.7	0.859
PSA (ng/ml)	2.7±1.7	4.1±3.6	0.127

Table 2. Clinical data

	HoLEP	TURP	p-value
Operating time (min)	79±32	103±34	0.008
Resected tissue weight (gram)	50±13.2	29±14.6	0.0001
Perioperative complication	1	3	0.0001
Bladder irrigation (min)	2441±1046	3050±266	0.0001
Catheterization time (min)	5285±2942	6465±8021	0.797
Blood transfusion (ml)	0	0	
Duration of hospital stay (days)	9	9	0.716

Statistical analysis

All data were presented as mean ± standard deviation (SD) and comparisons of both groups were carried out by the independent t-test. Significance was defined as a p values < 0.05.

Results

Sixty-two patients participated in the study, of which forty-four were surgically operated using TURP and 18 by HoLEP. The mean age in the TURP group was 71.4 (55-87) and 72.6 (59-83) in HoLEP group.

Preoperative baseline patient characteristics of each group such as; IPSS, quality of life score (QoL score), maximum flow rate (Qmax) and prostate volume are shown in Table 1.

There were no statistically significant differences between the two groups in baseline characteristics except IPSS.

Perioperative parameters including; operating time, resected tissue weight, perioperative complication, bladder irrigation, catheterization time, blood transfusion and duration of hospital stays of the each group are shown in Table 2.

Although operating time of HoLEP was statistically longer than TURP, significantly more tissue was removed by HoLEP. There was a significant difference in periopeartive complications between these two groups. Only one capsular perforation occurred in the HoLEP group whereas, two bladder injuries and capsular perforation occurred in the TURP group. Compared to TURP, bladder irrigation time was notably shorter in HoLEP. As for, catheterization time, blood transfusion and duration of hospital stays there were no statistical differences between these two groups. Catheterization time of HoLEP was shorter than TURP.

Discussion

Although there are several treatments for benign prostatic hyperplasia, TURP is still believed to be the gold standard treatment for BPH due to its efficiency, cost effectiveness and durability with low rates of long-term complications and re-treatment [2-5]. Recently, many treatment methods and techniques claim to challenge this gold standard treatment.

HoLEP has been offered to replace TURP owing to lower perioperative morbidity, reduced catheter times, hospital stays and the removal of increased amount of prostate tissue [10, 13]. Advantages and effectiveness of HoLEP have not been proven completely. However, it is considered to be an attractive technique for treatment of BPH. In the present study, we report our experience of HoLEP compared to TURP. Advantages of HoLEP such as; increased removal of tissue amount, shorter bladder irrigation time and fewer perioperative complications are similar to other studies [10-16]. For catheterization time, we found no significant difference between HoLEP and TURP, although Holmium laser technique is considered significantly shorter [11, 13-14]. As for operating time, HoLEP has a longer surgery time due to prolonged morcellation which is similar to other related studies [10-11, 14-16]. Longer operation time in HoLEP might be associated with removal of more prostatic tissue by HoLEP than TURP and prolonged morcelation time.

There might be a limitation in our study related to the number of patients who selected HoLEP due to the length of HoLEP treatment. Introduction and efficiency of HoLEP has not been evaluated completely.

In our experience, blood transfusion was not necessary with any patient in either group. This finding agrees with Barboza LE. et al. who reported there was no blood transfusions in HoLEP nor TURP [17]. However, in some reports, HoLEP is superior to TURP in terms of blood transfusion because of excellent hemostatic characteristics of holmium laser and partly due to high blood loss of TURP [7, 13].

Based on our current findings we conclude that HoLEP is a safe and effective procedure for surgical treatment of prostatic benign hyperplasia. The limitation of our current study is that the sample size was small. Thus, we are considering involving more patients in future studies of various aspects of HoLEP.

Conflict of Interest

The authors state no conflict of interest.

Acknowledgements

The authors thank Ankhbold Gombodorj and Baasansuren Selenge for their assistance with this study.

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